BUS Transportation

JUNE | 30TH ANNUAL MAINTENANCE NUMBER

1955 • 50 CENTS

What Makes Exhaust Valves Fail — p. 46

Two-Quart Water System to Check Bases — p. 50

The Annual Buyers' Guide — p. 68

Top performance...low cost...Perfect Circle gives you both!

1ST

Perfect Circle's 2-in-1 Chrome set provides the finest piston ring equipment obtainable! For the 2-in-1 set has both the *top* ring and the *oil* ring plated with thick, solid chrome. The entire area of ring travel gets complete wear protection, *more than doubling* the life of cylinders, rings and pistons. Thousands of extra miles of sustained power and positive oil control are assured. And, with Perfect Circle chrome, no tedious break-in is necessary because rings are pre-seated at the factory.

2ND

Perfect Circle's Custom Made piston ring set enables you to furnish, regardless of make or age of the engine, a satisfactory installation at a low price. PC's sectional steel oil ring is supplied in sets for badly worn engines . . . cast iron oil ring in sets for rebuilt or slightly worn engines. PC's Custom Made set is the outstanding bargain in price and performance.

Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Toronto, Ont.

DON'T MISS YOUR DOCTOR OF MOTORS CLINIC

Doctor of Motors Clinics, sponsored by your PC Jobber, are packed with facts of great benefit to you. Don't miss your next opportunity to attend. For your added interest and enjoyment, you'll see the latest movie of the Indianapolis 500 Mile race.

PERFECT CIRCLE

piston rings *The brand most people prefer*

For brake lining that will stop your buses smoothly, quietly, *surely*—on stop-start transit service or fast intercity schedules—you can't beat American Brakeblok.

And the maintenance records of leading bus operators prove American Brakeblok costs less per mile. Using the highest quality materials and rigid manufacturing control, American Brakeblok cuts your costs right down the line... wears slowly, evenly... requires fewer adjustments... protects brake drums... *lasts longer!*

Lower your brake lining costs, *keep them low!* Install American Brakeblok. Your nearby N.A.P.A. jobber can supply you. Call him today.

YOU'LL GET SURER STOPS WITH

American Brakeblok

reg. u.s. pat. off.

THICK BLOCKS

for every heavy-duty application

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AMERICAN Brake Shoe COMPANY

AMERICAN BRAKEBLOK DIVISION Detroit 9, Mich.

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(With which is consolidated Bus Age)

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BUS Transportation

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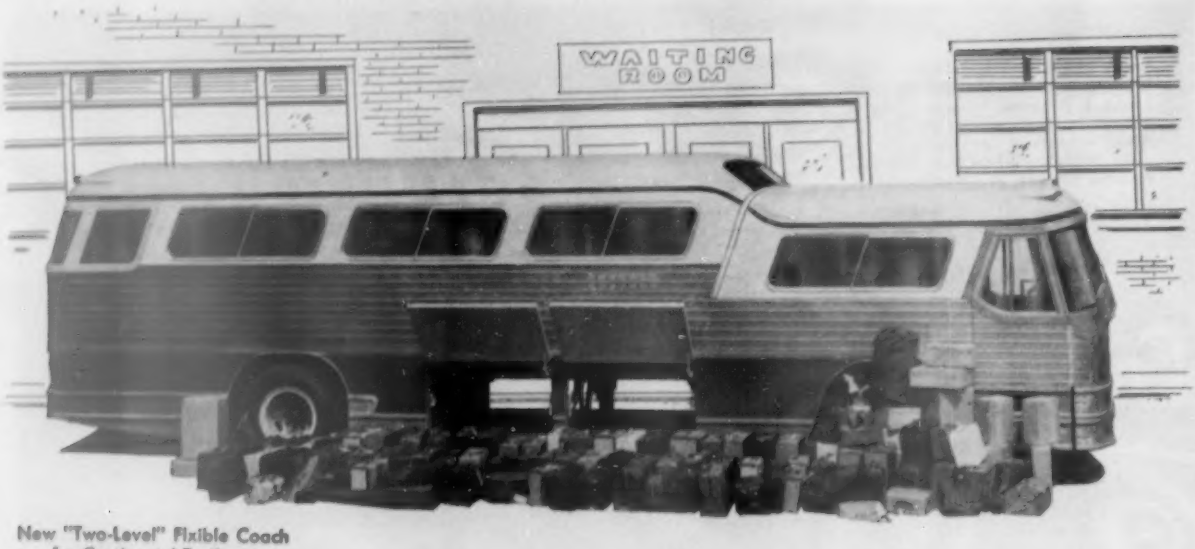

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. . . STEERED BY ROSS

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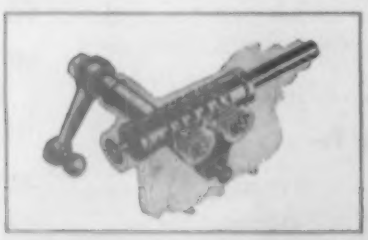
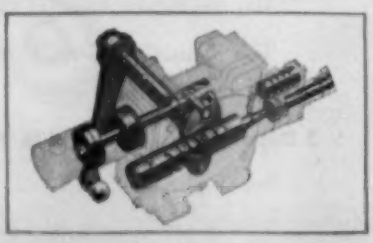
Ross provides the right gear for every steering need—*manual* or *power*. With inherent qualities of steering *ease, safety, dependability* and *economy* that have been winning friends for Ross-steered vehicles for nearly 50 years.

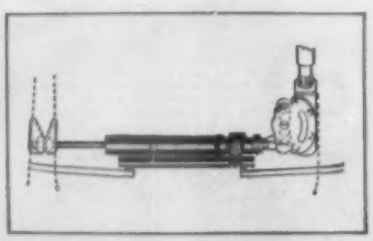
Ross invites discussion of *any* steering problem.

ROSS GEAR AND TOOL COMPANY, INC. • LAFAYETTE, INDIANA

Ross STEERING







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Comfort for commuters means revenue for operators

- Geneva quality woven fabric, or 42½-oz. vinyl-coated fabric
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- Deluxe spring cushion
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- 16-gauge, 1"-O.D. tubular frame
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- More individual sitting space
- Tubular aisle and wall legs
- Oven-baked enamel finish, except as otherwise noted

Alternate features:

- Other types of covering material
- Deluxe, saddle-shaped, continuous full-depth, foam-rubber cushion

American Commuter Non-Recliner Model 5405

American Seating Company
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Grand Rapids 2, Michigan
Branch Offices and Distributors in Principal Cities
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STAR THEATER
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JIMMY DURANTE or
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on television...
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TEXACO

TEXACO

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Texaco D 303 Motor Oil HD is heavy duty and fully detergent and dispersive. It maintains its tough lubricating film in the severest service. It prevents bearing corrosion, keeps wear at a minimum. In addition, *Texaco D 303 Motor Oil HD* resists oxidation, prevents harmful engine deposits, keeps rings free for proper compression and combustion. You get full power, use less fuel, and can safely extend ordinary scheduled overhaul periods.

For chassis lubrication, use *Texaco Marfak*. It won't pound or squeeze out, gives extra hundreds of miles of protection against wear and rust.

For wheel bearings, use *Texaco Marfak Heavy Duty*. It seals out dirt and moisture, seals itself in—assuring safer braking, longer bearing life. Gives extra thousands of miles of protection. No seasonal change required.

For transmissions and differentials, use *Texaco Universal Gear Lubricant EP*. It stands up in heaviest service, assures smoother operation, longer gear life.

Let a Texaco Lubrication Engineer help you get and maintain maximum fleet operating efficiency. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

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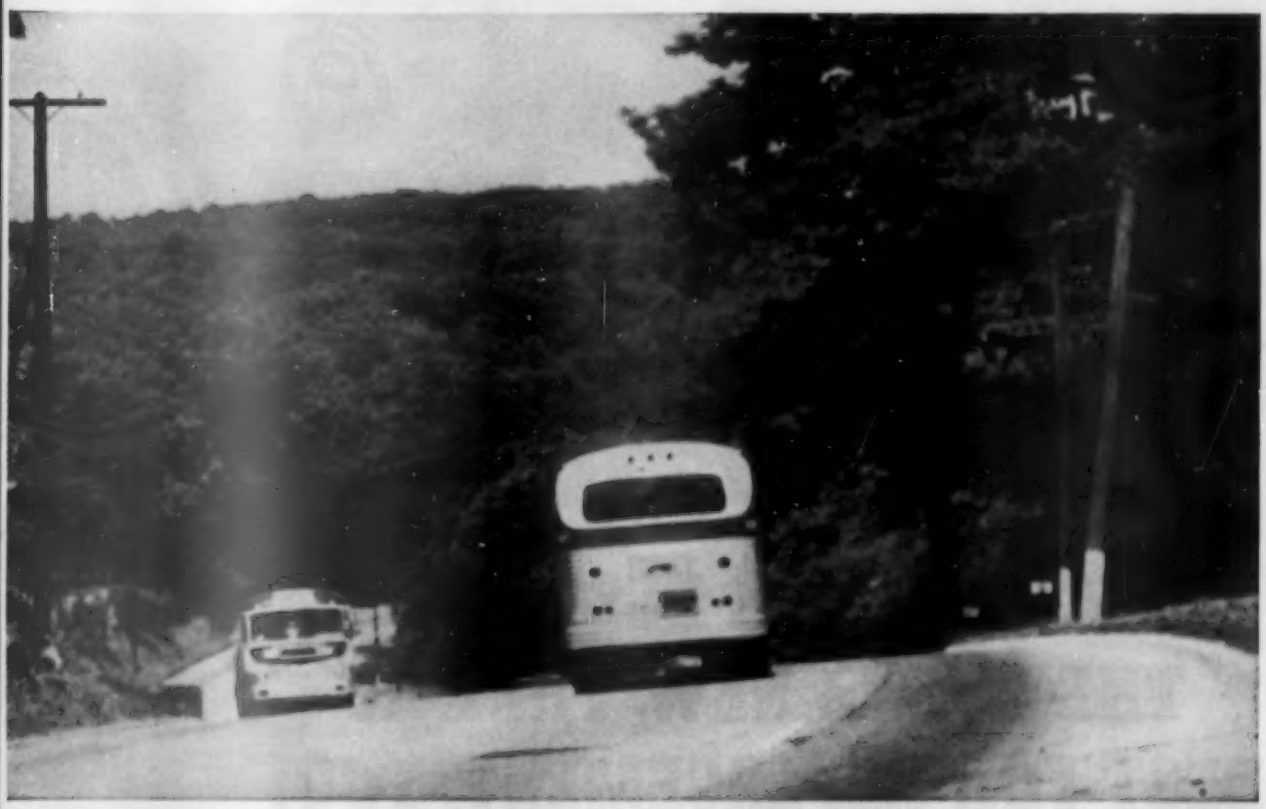
The Texas Company, 135 East 42nd Street, New York 17, N. Y.



Lubricants and Fuels
FOR THE BUS INDUSTRY

Accurate to 50 millionths of an inch

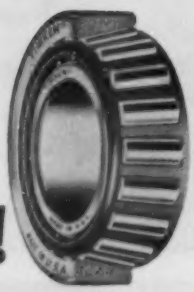
(Another reason why TIMKEN® bearings are first choice with bus manufacturers)

ACCURATE to 50 millionths of an inch, this Universal Measuring Machine checks the gages and machine parts used to make Timken® tapered roller bearings. The Timken Company has one of the world's best-equipped gage inspection laboratories. It contains precision equipment, some of which is so unusual we had to develop it ourselves. It's another reason Timken bearings are the number-one value for your vehicle's moving parts—the vital zone.

Only Timken tapered roller bearings give you all these advantages: (1) made of nickel-rich steel made in our own electric furnaces, (2) advanced design, for true rolling motion, (3) rigidly controlled quality, (4) precision manufacture. That's why Timken bearings are first choice with men who know buses best—bus manufacturers.

For the best possible tapered roller bearing replacement, take a hint from bus manufacturers. Make sure it's stamped with the trade-mark "Timken". For helpful service information, send for your free copy of "Timken Tapered Roller Bearings, Their Care and Maintenance". Write Dept. TB-6, The Timken Roller Bearing Company, Canton 6, O. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

SINCE THEY'RE BEST WHEN THE BUS IS NEW, THEY'RE BEST FOR REPLACEMENT, TOO!



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

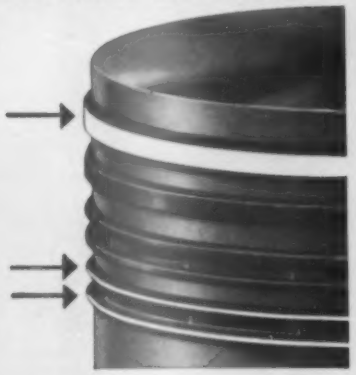
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭

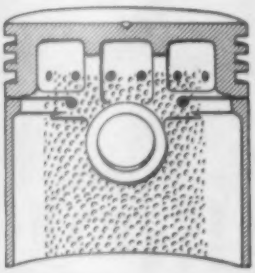
BEARING TAKES RADIAL ↓ AND THRUST →◎← LOADS OR ANY COMBINATION →◎←

Maximum oil economy

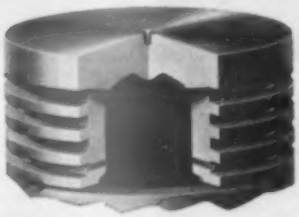
EVERY RE-RING JOB DESERVES ALL THREE . . .



1. Kromex Ring Sets are the most economical, measured by miles. Factory-seated for instant oil control—chrome-faced top ring and oil ring side rails for longest wear.



2. Sealed Power SUPER-SIZER is the world's best resizing method, increases resiliency and outward tension on trust faces, expands skirt to original close fit, leaves piston skirt surface smooth.



3. Sealed Power GI-60 Groove Insert is the only dependable, economical method of restoring top groove to original size and protecting against future wear.

Sealed Power KromeX

PISTON RING SETS . . .

assure your engine

- maximum oil economy
- faster pick-up
- smoother performance
- double ring life
- positive lubrication

assure YOURSELF

- lower cost per mile
- more miles of good service
- no come-backs

SEALED POWER CORPORATION • MUSKEGON, MICHIGAN

GET IT FROM YOUR JOBBER

Sealed Power Piston Rings

BEST FOR RE-RING! BEST FOR RE-BORE!

RINGS • PISTONS • PINS • SLEEVES • VALVES • WATER PUMPS

What do you look for in Brake Blocks?

Whether yours is a fleet of over-the-road trucks, high-balling along the expressways . . . or whether it's a bus fleet, with brakes working constantly in congested, stop-and-go traffic . . . it will pay you to specify Thermoid Brake Blocks.

Regardless of operating temperatures or weather conditions, Thermoid Brake Blocks perform evenly and consistently—pass the most rigid stopping tests. Highest quality ingredients, compounded under Thermoid's exclusive Dry Mix Process, assure long life and non-fading action.

Insist on genuine Thermoid Brake Blocks for maximum safety at minimum cost-per-mile!

Thermoid

Thermoid Company • Trenton, New Jersey

the standard of precision processing in brake lining, brake blocks, clutch facings, hydraulic brake parts and fluid

Capitol Building at Little Rock, Arkansas — City of Roses

GM DIESELS
cut seat mile operating costs 50%

AT CAPITOL TRANSIT CO.

Bisected by the Arkansas river, and with only two heavily travelled bridges connecting, Greater Little Rock presents some tough scheduling problems for F. Norman Hill (left), President, and Phil Askey, Vice-president of Capitol Transit Co.

The new Kingswood subdivision is typical of the hilly terrain at Little Rock, where a minimum of connecting streets create difficulties in providing service.

...OPERATE 52.3% MORE MILES between schedule delays

A GM Diesel conversion program begun in January, 1952 is producing valuable economies for Capitol Transit Co. This operator purchased 13 TDH-4509's in early 1952, and 12 TDH-4512's in April, 1954.

These 45-passenger Diesels have had excellent public acceptance. Their flexibility has made possible scheduling anytime and anywhere to meet changing conditions and gain maximum revenue.

By providing 27% more seating capacity, and by conspicuous savings in fuel and maintenance, seat-mile operating costs during 1954 were 50% lower than the system's post-war fleet of 31 and 36-

1954 Diesel fuel mileage averaged 4.41 miles per gallon in hilly circuitous route service – or 53 cents per 1000 seat miles vs. 87 cents for the gas-powered fleet. Diesel direct maintenance cost was 2.54 cents a mile for parts and labor.

Every Diesel is scheduled every day . . . inspections are made between peaks. With standardization the company foresees 100% Diesel operation with only 3% spares, compared to 10% for gas-powered coaches.

GM parts interchangeability, plus proximity of a new warehouse at nearby Memphis is already reducing floor space required for parts stock.

DIESEL INVENTORY...

only $247.75 per coach

passenger gas-powered coaches . . . $1.10 per 1000 seat miles for the Diesels vs. $2.22 for gas.

Schedule delays were also much less frequent. During 1954, the Diesels operated 16,041 miles between schedule delays, compared to 10,533 miles for gas, or 52.3% more miles.

Accumulated mileage of the first thirteen Diesels amounted to 1,820,364 as of April 12, or 140,028 miles average. None have required new rings or sleeves to date.

Clutch life ranges from 80,000 to 130,000 miles — only 2 transmissions have as yet required overhaul.

Diesel inspection periods have been widened several times . . . 3,000 to 6,000 . . . to 12,000 . . . to 18,000. "Experience has proved we don't need such frequent inspections," says Garland Reaves (seated), Supt. of Maintenance.

This machine tests compressors under actual operating conditions – for noise, efficiency of air pumping, and oil passage. None of the Diesels' compressors have required re-building to date.

DIESELS
replace trolley coaches
WEEK-ENDS

Thirty-one trolley coaches still operated by Capitol Transit Company are taken out of service week-ends and the entire system served by motor coach.

This enables the company to close the trolley coach garage, resulting in economies, and operate out of one division.

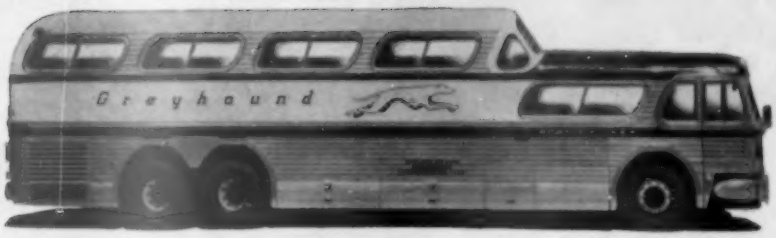
Numerous Saturday parades in the summer time, which disrupted and often halted trolley coach operation downtown, do not pose any problem with the more flexible Diesels, the company states.

GM COACH

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

PRINTED IN U. S. A.

SASH FOR EVERY TYPE OF TRANSPORTATION—ON LAND, ON THE SEAS, IN THE AIR



GREYHOUND SCENICRUISER
The bus with the ultra-modern "dream-ride". Features uncluttered, streamlined styling inside and out — plus "picture window" Edwards Sash to give passengers "front row" visibility on America's matchless scenery.

EDWARDS SASH PUTS THE "SEE" IN SCENICRUISERS

We're proud that Edwards Sash — traveling companion of Greyhound over millions of highway miles — was selected to provide the visibility for Greyhound's revolutionary new Scenicruisers. It effectively underscores what we've often told you in these pages—"Leaders in Transportation standardize on Edwards Sash—profit-minded operators specify it."

Cross-town, or cross-country, whatever the type of bus or service — there's an Edwards Sash that meets exactly (and economically) every operating and service requirement. Write today for complete information.

Edwards Sash Gives You

- Maximum Visibility
- Lower Maintenance
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- Rattle-free, Weather-tight Fit
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- Streamlined Construction

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The Eyes of Transportation

The Engineer's Report

CASE HISTORY

LUBRICANT RPM Delo Oils

FIRM Greyhound

Greyhound's new Scenicruisers use RPM DELO Oils!

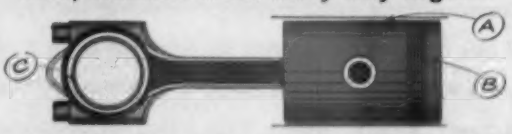
$49,000 WORTH OF HIGHWAY LUXURY—that's Greyhound's new Scenicruiser. Five hundred of these 43-passenger luxury coaches are going into service on through routes. These twin diesel power units, as well as other Greyhound buses in the West, use RPM DELO Oils—chosen by Greyhound because of its years of outstanding performance with these quality oils. Power from the two side-by-side 150 h.p. diesels for each coach goes through two fluid couplings and a multi-speed transmission to the forward axle of the tandem rear unit; rear axle rides free. Each coach has captive air suspension, power brakes, power steering and air conditioning, and will operate on either engine.

FOR MORE INFORMATION about petroleum products of any kind or the name of your distributor, write or call any of the companies listed below.

RPM DELO LUBRICATING OILS

TRADEMARK "RPM DELO" REG. U. S. PAT. OFF.

How RPM DELO Oils reduce corrosion, wear, oxidation in all heavy-duty engines



A. Contain special additives that provide metal-adhesion qualities...protect parts whether hot or cold, running or idle.

B. Anti-oxidant resists deterioration of oil and formation of lacquer...prevents ring sticking. Detergent keeps parts clean...helps prevent piston scuffing.

C. Special compounds stop corrosion of any bearing metal and foaming in crankcase.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

FT. WAYNE TRANSIT

Places in Service 60TH

BUCK-CYCLONE CLEANER

- Each night every bus interior is literally blown clean of dust and debris by a 30 mile an hour wind.
- Now there is no further need for costly hand sweeping.
- Literature upon your request.

• Some wind! Miss Nancy Moran of Ft. Wayne Transit shows what happens to a pretty girl caught in the bus when the big blow starts.

One Man Can Thoroughly Clean a Bus Interior In 3 Minutes

MANUFACTURED EXCLUSIVELY BY

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CHICAGO DAILY NEWS BUILDING, CHICAGO

CLYDE P. ROSS, *President* DAVID E. WHITE, *Vice President* CARLETON P. ROSS, *Vice President*

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Talk about TOUGH Bearings

. . . IT'S HARD TO BEAT PERFORMANCE LIKE THIS!

Hard Chrome Surfacing Engineers — With Years of Experience

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INCORPORATED
SALES AND SERVICE — ENGINE REBUILDERS

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Magnaflux Work
Cylinder Head Surfacing
Camshaft Grinding

40-57 East 7th South
Salt Lake City 2, Utah
Phone 32-0011

April 25, 1955

Mr. T. L. Camp
Federal-Mogul Corporation
11031 Shoemaker Ave.
Detroit 13, Michigan

Dear Tom:

We [illegible] to you a [illegible] set of con rod bearings and main bearings removed from a Cummins engine, Model NH. These Federal-Mogul bearings have gone 299,218 miles.

This [illegible] in heavy freight in this Western area. It makes trips as far north as Canada, as far south as El Paso, Texas, to and from Los Angeles, San Francisco and the Northwest. It has also been used to haul coal from the mines at Orangeville, Utah. It has been operated under all kinds of conditions, both in cold weather and in the hot summer, hauling as much as (25) tons pay-load.

The engine is used in a tractor belonging to the L. D. S. Church, and is used in their Church Welfare program.

When the engine was torn down, it was not because of failure of the bearings. It was torn down in a maintenance program and the bearings were removed in this program.

The crankshaft on this unit showed less than .001 wear and the only work done on it was to magnaflux it, microfinish it and install it in the engine with another set of Federal-Mogul bearings.

If this information is of any value to you, we are more than pleased to furnish it to the Federal-Mogul Corporation, as well as our fine friends.

Expressing to you our best wishes, we remain,

Sincerely,

by J. Leonard Love
President and General Manager

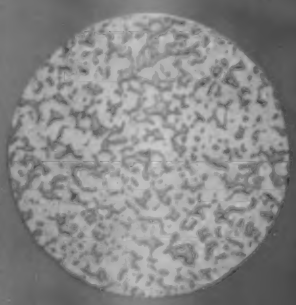
JLL/lbg

Here is one of the connecting rod bearings from the 299,218-mile engine. It still has plenty of miles left in it!

Talk about Federal-Mogul "CP's"

. . . THEY ARE REALLY TOUGH ENGINE BEARINGS!

1—Steel back. 2—Sintered copper-lead lining. 3—Lead-tin overplating.



Photomicrograph of sintered copper-lead lining. Note the even distribution of copper (light) and lead (dark).

Federal-Mogul CP bearings are made by the continuous strip process, in which pure copper-lead powder is sintered to steel strip. (In sintering, heat and pressure are used to compact the powder and bond it to the steel.)

Federal-Mogul's patented powder production permits amazing alloy control and purity. *Each tiny powder particle* is an alloy of the desired proportions of copper and lead.

What does this mean to fleet operators? It means that the bearing lining is *exactly right*. Your bearings have the strength and load-carrying ability of the copper, and the softer bearing properties of the lead, in perfect balance. Your heavy-duty engine can depend on these bearings for maximum mileage and performance.

For fleet mileage, you need heavy-duty bearings . . . and for heavy-duty bearings, it's hard to beat a Federal-Mogul CP! Ask your Federal-Mogul jobber!

FEDERAL-MOGUL SERVICE

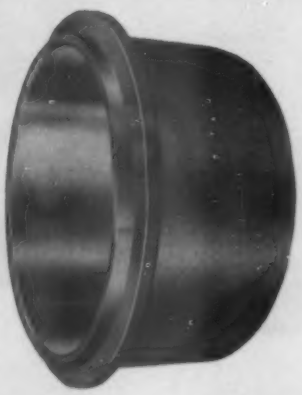
Division Federal-Mogul Corporation

DETROIT 13, MICHIGAN

BEARING FEDERAL Mogul SERVICE

They're ENGINEERED---
That's the BIG DIFFERENCE!

REYCO®
BRAKE DRUMS



Yes, that's the BIG difference! The engineering that goes into every Reyco Brake Drum is scientific calculation. It puts reinforced strength where needed to assure uniform expansion and complete rigidity (full shoe contact) under pressure. It guarantees sound design, which combined with basically better Reyco metal, does away with the cause of most brake drum failures.

PLAIN—
RIBBED—
FLANGED—

Reyco Engineering provides **all three,** and from the one designed for your operation, you'll get **the best brake drum service possible to obtain!**

Engineering which prevents fadeout and the excessive temperatures directly responsible for too frequent brake adjustments, relining jobs and even complete drum replacements, means savings in money and added safety for cargo and crew. Install Reyco Engineered Brake Drums and you've taken the right step to minimize downtime and for accident protection in your fleet.

D-255

SEE YOUR NEARBY REYCO DEALER!

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REYNOLDS MANUFACTURING CO.

SPRINGFIELD, MISSOURI

THERE'S JUST NO END

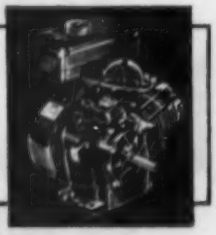
TO THE END USES OF CONTINENTAL RED SEAL® POWER

Within Continental's range, from two to 1,100 horsepower, it would be hard to name a type of engine-driven product—vehicle, aircraft, boat, or industrial machine—of which one or more of the leading makes do not rely today on Continental power. As might be assumed from the current trend toward greater specialization, the list of such applications is longer than ever before. The field of Red Seal usefulness has broadened to the point where—as this list suggests—there is almost no end to the industrial uses of dependable Continental power.

●

Air Compressors . . . Air Conditioners . . . Airplanes . . . Backfillers . . . Balers . . . Binders . . . Blowers . . . Buses . . . Bulldozers . . . Combines . . . Commercial Boats . . . Concrete Mixers and Pavers . . . Conveyors . . . Cranes . . . Crop Dusters . . . Derricks . . . Ditchers . . . Drill Rigs . . . Earth Borers . . . Earth Movers . . . Electric Welders . . . Elevators . . . Ensilage Cutters . . . Excavators . . . Farm Tractors . . . Gathering Pumps . . . Graders . . . Hay Loaders . . . Heavy Engine Starters . . . Helicopters . . . High Lifts . . . Hoists . . . Industrial Tractors . . . Irrigation Pumps . . . Loaders . . . Lumber Carriers . . . Materials Handlers . . . Oil Field Machinery . . . Parcel Delivery Trucks . . . Pile Drivers . . . Pipe Benders . . . Portable Generators . . . Rail Cars . . . Rollers . . . Rock Crushers . . . Saw Mills . . . Separators . . . Shovels . . . Snow Plows . . . Sprayers . . . Street Flushers . . . Street Sweepers . . . Threshers . . . Trainer Aircraft . . . Transit Mixers . . . Truck Tractors . . . Warehouse Trucks . . . Winches, and many others.

Continental also builds 4-cycle air-cooled models, from 2 to 3 h.p., for many industrial and farm applications, both conventional and vertical shaft. (AU series illustrated.) Advanced engineering gives them easy starting, high dependability, and unusual lugging capacity at low speeds. For information, address Air-Cooled Industrial Engine Div., 12800 Kercheval Ave., Detroit 15, Mich.



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SERVICE FACILITIES AND GENUINE RED SEAL PARTS ARE AVAILABLE EVERYWHERE

Continental Motors Corporation

MUSKEGON • MICHIGAN

6 EAST 45TH STREET, NEW YORK 17, NEW YORK • 6218 CEDAR SPRINGS ROAD, DALLAS 9, TEXAS • 3817 SOUTH SANTA FE AVENUE, LOS ANGELES 58, CALIFORNIA • 910 SOUTH BOSTON STREET, ROOM 1008, TULSA, OKLAHOMA • 1252 OAKLEIGH DRIVE, EAST POINT (ATLANTA) GEORGIA

DOWNTIME COSTS MONEY. Catch flats in your service shop where they don't cost as much as when the load's down on the highway. Gauge and record air pressure of all tires regularly. Most flats give a slow-leak warning signal that can *only* be found by accurate gauge readings. A comparison of readings will point out slow leaks.

Certify the accuracy of your gauging-inflating equipment with a Schrader 8106B Trutest Special Gauge. For all your tire inspection work use the Schrader 7188BH All-Purpose Service Gauge. When tire maintenance calls for tube repair and valve replacement jobs, do 'em fast and sure with a Schrader Electric Vulcanizer. And always use genuine Schrader Tire Valves. Order them from your supplier today.

FLEET SERVICE
is more profitable with Schrader TIRE SERVICE

A. SCHRADER'S SON
Division of Scovill Manufacturing Company, Incorporated
470 Vanderbilt Avenue, Brooklyn 38, N. Y.

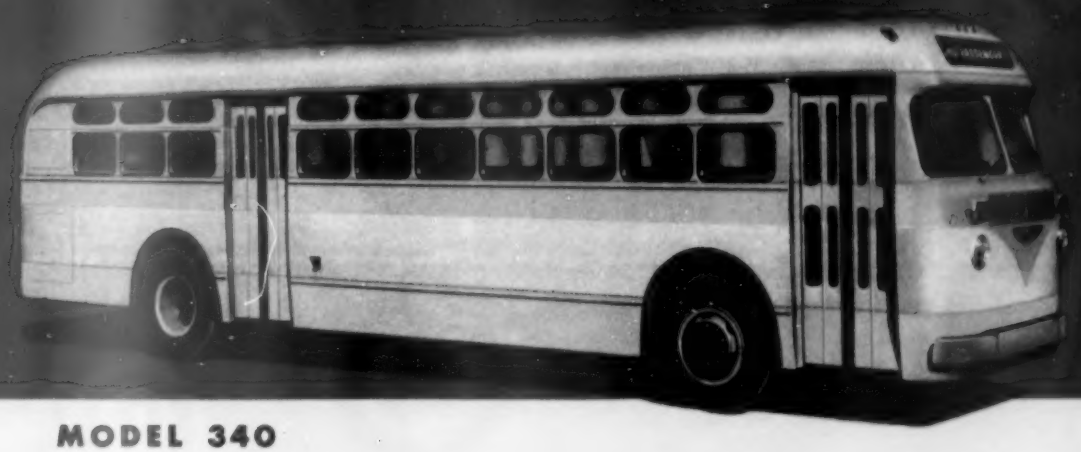
Schrader
REG. U. S. PAT. OFF.

FIRST NAME IN TIRE VALVES
FOR ORIGINAL EQUIPMENT AND REPLACEMENT

ONLY THE 40 Passenger

Transit Bus

GIVES YOU THE MANY ADVANTAGES OF A V8 Engine



MODEL 340

for the most advanced bus

Transit CCM Buses, Inc.

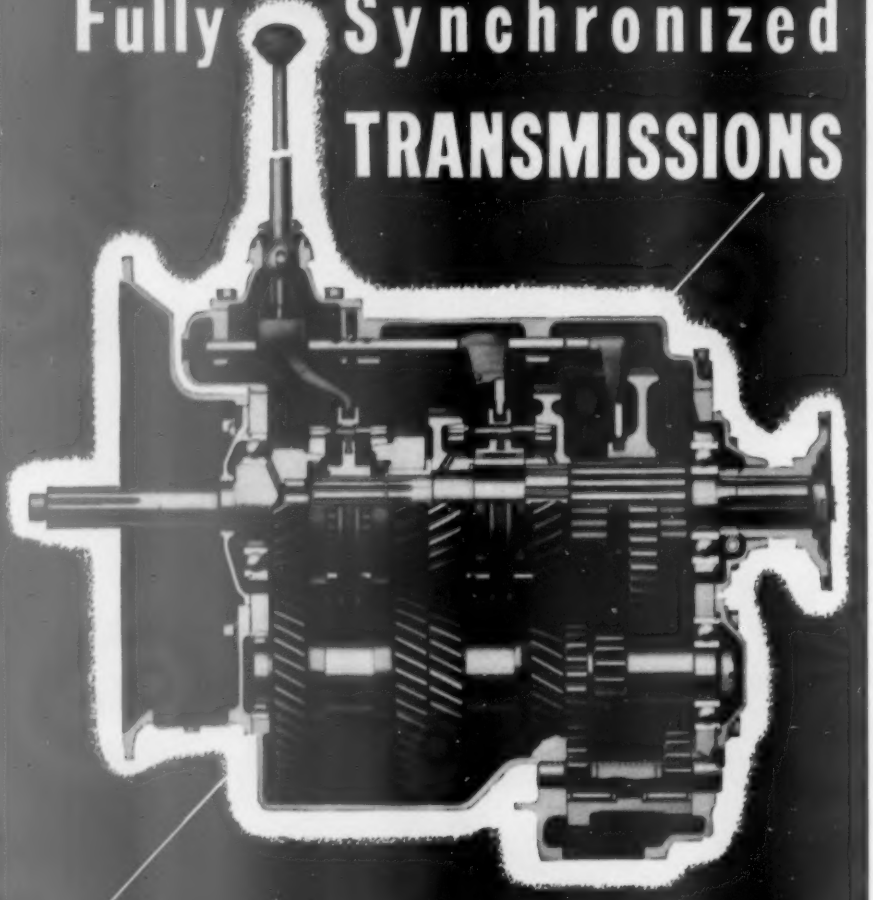
Subsidiary of

CHECKER CAB MANUFACTURING CORP.

Factory:
KALAMAZOO, MICH.

Sales Offices:
SCHAEFER RD. at ELMIRA
DETROIT 27, MICH.

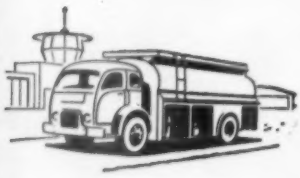
Over 250,000 Spicer Fully Synchronized TRANSMISSIONS

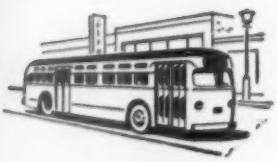


have been built since 1934 for every kind of heavy-duty civilian and military use!

SPICER PRODUCTS: TRANSMISSIONS • UNIVERSAL JOINTS • PROPELLER SHAFTS • AXLES • TORQUE CONVERTERS • GEAR BOXES • POWER TAKE OFFS • POWER TAKE OFF JOINTS • RAIL CAR DRIVES • RAILWAY GENERATOR DRIVES • STAMPINGS • SPICER and AUBURN CLUTCHES • PARISH FRAMES

Spicer





DANA CORPORATION, TOLEDO 1, OHIO

"Up to twice the life"

—say leading transit companies

Look for TG*

Look for these letters "Tg" on the belt itself—as well as on the label—of every belt you buy for rear engine service. "Tg" means that the belt has been specifically engineered for Coach Rear Engines.
*Reg. U.S. Pat. Office.

Gates

The mark of specialized research

TPA 49

Actual performance records of leading transit companies show that the Gates Coach Belt—the belt marked "Tg"—gives up to *twice* the service life of other belts they have used.

The Gates Coach Belt is engineered specially for rear engines. Built for *extra* heavy duty, it has a tough, flexible, multiple-ply cover. And the tensile section—the part that carries the load—is built with special high-strength, long-life cords. Furthermore, special rubber compounds make the Gates "Tg" Belt ...

OIL PROOF and HEAT RESISTANT.

These engineering features give you important benefits: Traffic delays and operating costs are cut; belt replacement costs are cut *as much as half*.

Without obligation a Gates Belt Specialist — available through your Gates Jobber—will survey your needs and make cost-cutting recommendations. Your Gates Jobber will supply you promptly. There is a Gates Jobber in every distribution center. The Gates Rubber Co., Denver, Colorado. *World's Largest Maker of V-Belts.*

Gates Coach Belts

SPECIALLY ENGINEERED FOR REAR ENGINES

J-M Brake Blocks are standard equipment on the *Greyhound* Scenicruiser

Greyhound's Scenicruiser represents the ultimate in engineering achievement in the automotive field. The safest bus ever built, it relies on Johns-Manville asbestos brake lining for safe, reliable stops.

Johns-Manville Brake Blocks

give top performance at lowest cost per mile on any heavy duty vehicle

WHETHER you operate buses or a fleet of heavy duty trucks, Johns-Manville Brake Blocks will give you lower brake cost per mile, smoother stops, minimum shop and out-of-service time. You'll get dependability, too, under all driving conditions.

Johns-Manville Brake Blocks are supplied in individual units, or combination sets of high, medium or low frictional characteristics. Regardless of the type of brake, or service conditions under which it must operate, there is a J-M Brake Block custom-engineered for the specific job it has to do.

For further information about Johns-Manville Brake Blocks, write to Automotive Manager, Johns-Manville, Box 60, New York 16, N. Y.

JM PRODUCTS

Johns-Manville *asbestos* BRAKE LININGS

Reo Advertisement

B & W Rents out School Buses . . .

. . . On a 'You-Drive-It' System

A "YOU-DRIVE-IT" SCHOOL BUS rental service is being operated in New England by the Boston, Worcester and New York Street Railway Co. of Framingham, Mass.

It was alert management at B & W that set up this promising new venture in school bus transportation. Two years ago the bus company set up a subsidiary corporation called "School Bus Rental Service, Inc."

As the name implies, this new outfit is in the business of renting school buses. They furnish everything but the driver, and are even prepared to help a customer pick the right man or men for that job, too.

Like so many other transit companies, B & W has had, over the years, some experience with school bus operations. In the past, it had provided complete school tranportation for Framingham and several other communities it serves.

But like other transit companies, B & W ran into a difficulty—how to square the relatively high costs of this part-time service, during two peak hours a day, with relatively tight school budgets. Not the least of the bus company's problems was personnel—it had to tie up badly needed buses and drivers during those peak hours, and then find something to do with the drivers when they weren't on school runs.

Unlike other transit companies B & W, instead of giving it all up as a bad job, decided to see if its knowledge, facilities and resources could somehow be used — profitably, of course—in school transportation work.

Leland L. Waters, general manager and treasurer of B & W, Gustav E. Heiber, maintenance vice-president, and Walter F. Jerome, vice-president in charge of transportation, talked the matter over from every angle.

This appears to be the era of the "package plan," they decided, so that is precisely what they came up with. Their plan may not make school transportation a completely painless proposition, but it certainly eliminates the guesswork and the headaches and, more importantly, reduces the costs of the service.

Here is a picture of how they are set up, and what they offer customers.

School Bus Rental Service, Inc. was set up in July, 1952. Waters was named vice-president and general manager, and Heiber and Jerome were named vice-presidents. These three men, with help from a number of other B & W staffers, including Paul Benoit, Arthur Bowes, John Evans and Robert Moore, have made it tick ever since.

Inventory back in 1952 consisted of nine brand new Reo school buses each with an Oneida body, and seating capacity for 58 children. In addition, the new company had a spare parts supply and, above all, facilities and ability to service these vehicles.

At the start of the school year in 1952 the new outfit had lined up rental arrangements for use of these vehicles with school committees or local school bus contractors in Framingham, Dedham and Needham.

An indication that they had come up with something really promising is found in the fact that by last year —the second school year of operation—they had leased 20 buses in nine different communities.

By the time the school opens this fall they expect to have up to 50 buses leased in 20 different communities, with at least one in Connecticut and probably two in New Hampshire.

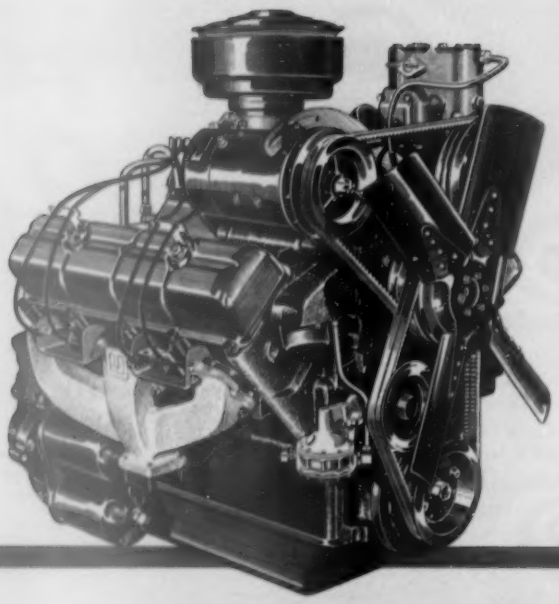
Interest in the idea is growing steadily. Almost daily they hear from, or make a call on a prospective new client. That client may be a school superintendent, the chairman of a school committee, or a local bus contractor or town official.

Rental terms work out like this. There is a flat basic charge for the school year of $1,800. This figure was derived largely from the fact that in Massachusetts the school year contains 180 days, and a rate of $10 a day was established.

In addition to this, the company charges the client 12 cents a mile for actual mileage operated by each bus rented.

100,000 MILE WARRANTY

now on all REO GOLD COMET ENGINES



When you buy Reo power, you buy *insured performance. Insured up to 100,000 miles or one year* by Reo's new iron-clad, factory-backed warranty.*

Reo's 100,000 Mile Warranty covers Reo's complete power range of rugged Gold Comet Engines—from gasoline and LP-Gas 6's to Reo's new 220 h.p. Gold Comet V-8's, the most powerful V-8 truck engines ever built.

Warranty covers engine models—255 OA, 292 OA, 331 OA, OH 160, OV 195, OV 220, OH 160 LPG, 255 OA LPG, 331 OA LPG. Available through Reo Factory Branches, Distributors and Dealers nationwide. Buy Reo . . . replace with Reo . . . and be *doubly* sure of performance.

** See your Reo representative today for complete information.*

REO MOTORS, INC.

SUBSIDIARY OF **BOHN** ALUMINUM AND BRASS CORPORATION

WATCH REO ROLL

That's the cost end of the packaged school bus deal.

But the service features are numerous, and, to many harassed school officials, most attractive.

School Bus Rental Service, Inc. offers the following:

1. All necessary gasoline, oil, grease, tires and repairs. The company agrees to keep the vehicle in good working condition at all times, and to provide a replacement bus in case the original bus becomes disabled from any cause.

2. Complete public liability insurance with $100,000-$300,000 limits, and property damage coverage of $5,000.

3. All necessary regulations, licenses and permits for the transportation of school children.

4. The name of the operator or school department will be placed on the bus if desired.

5. The bus may be used for transportation of students to athletic events or other activities at no additional cost beyond the standard 12-cent mileage chart.

6. Clients may call on the company's staff for surveys of community school transportation requirements, for assistance in the arrangement of routes and service, and for help in the recruiting and training of drivers . . . all without any obligation.

This latter service is really thorough, too. Just as an insurance agent or broker will, without cost or obligation, sit down with a prospective client and analyze his holdings, resources and requirements, so will this knowledgeable staff of transportation experts sit down with a local school board and analyze its current operations.

School Bus Rental Service recently completed a survey of this kind for one Bay State school district which, probably for the first time, now has before it a clear and concise report on what it has in the way of school transportation and what its costs per bus mile actually are.

This school district is not yet a customer, but the rental service expects that one day soon it will be.

For included in the report it received are tables showing comparable costs to the district if it made use of the whole, or even a part of the rental package plan.

Annual savings to the school district would, in this instance, range up to $5,000 . . . no small amount to the average tight-budgeted school board.

When a bus is out on rental it remains in the hands of the local contractor or school district during the entire school year. Here's the way service arrangements are made.

The company contacts a local garage or service station in the community which, in addition to supplying all the fuel and lubrication, also makes a specified daily check of the vehicle itself.

This station or garage is given a printed form on which fuel consumption and daily service checks must be noted. These reports are mailed to the Framingham home office every week.

Once a month a maintenance superintendent from the Framingham service center takes to the road to make a personal check on each bus in each community.

Three times a school year every vehicle is brought into the service center for a thorough overhaul.

Even at this early date—only two years after it started—it appears certain that B & W has come up with something promising, popular and profitable.

Already it can be said that the rental plan has:

1. Provided safe transportation for school children, in the newest, safety-engineered vehicles. It has also had the effect of permitting school districts or contractors to update their equipment.

2. Reduced costs of school transportation in communities where it has been set up.

3. Provided a new and simple means for communities to evaluate their existing facilities. In the long run, it seems certain, the plan will have a generally stabilizing effect on school transportation costs, even in those communities which do not use the service.

4. Last, but by no means least, it has provided B & W with an additional source of revenue and growth, and made it possible for the transit company to keep key personnel on the payroll in spite of tightened regular schedules and a dropping of unprofitable lines of operation.

(Reprinted from July, 1954 Bus Transportation)

Reos really stand up in school bus service

. . . says *Leland L. Waters*

MR. LELAND L. WATERS
Vice President and General Manager, School Bus Rental Service, Inc.

We are convinced after three years of using Reo school buses that Reos really do a job for us. We find Reos, built to our specifications, provide rugged reliability, safety, and economy in school bus service. Our Reos are always ready to go and their economy of operation and low maintenance requirements help us offer a reliable service at a reasonable charge. They help us make a profit, too.

For complete information on Reo school bus chassis and Gold Comet Engines see the yellow pages of your telephone book or write—
Reo Motors, Inc. Subsidiary of Scbn Aluminum and Brass Corporation, Lansing 20, Michigan, or in Canada, Toronto, Ontario.

Leland L. Waters

Vice President and General Manager
School Bus Rental Service, Inc.

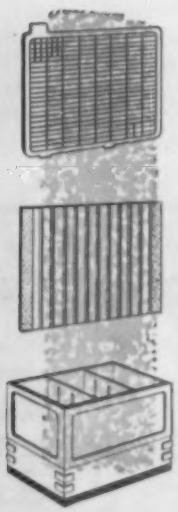
★ ★ ★ ★ ★ DELCO EXTRA-DUTY BACK UP EVERY CLAIM OF

"Low-cost operation" is a pat phrase used by many. While others talk about this desirable feature in a battery, Delco does something about it. Delco builds it into the battery right from the start. This requires the combined research and engineering facilities of Delco and General Motors, plus their exceptionally high standards of production and quality of materials.

The result is well worth the effort. For wet or dry charge, Delco Extra-Duty batteries deliver the lowest possible cost per mile of operation, and a balanced performance that is unsurpassed in the industry.

Check the Delco Extra-Duty features shown here. See how they can add miles and miles of service to your fleet. They're all representative of the high quality Delco builds into batteries. Then see your Delco distributor about this Extra-Duty battery that's built to back up all claims of "low cost operation."

Extra-Duty Features on both Wet and Dry Charge Batteries



EXCLUSIVE NEW DELCOLOY GRID

Delco's unique grid design increases battery life as much as 100% by even distribution of current and a superior resistance to overcharge and corrosion.

SUPERIOR RUBBER SEPARATORS

Delco's microporous rubber separators offer a new high in resistance to vibration, acid attack, peroxidation and are designed to withstand extreme temperatures.

HARD RUBBER THERMO-RIGID CASES

Delco's genuine hard rubber case is completely resistant to acid absorption, heat, bulging, warping or other distortion.

BATTERIES ARE BUILT TO "LOW-COST OPERATION"★ ★ ★

Conveniently Packaged Electrolyte

Here's good news for fleet owners. For the many fleet men who prefer the dry charge battery, Delco now has a new container to facilitate the handling and storing of electrolyte. It's a disposable container designed to meet all shipping requirements. Since Delco's dry charge batteries require no initial charge, all you do is add the electrolyte from this convenient container and your vehicles are ready to go.

ZIP

ZIP off the top of the sturdy fibre board container, with the built-in pull string. It's that simple to open.

CLIP

CLIP the corner of the acid-proof polyethylene bag that's attached permanently to the container.

POUR

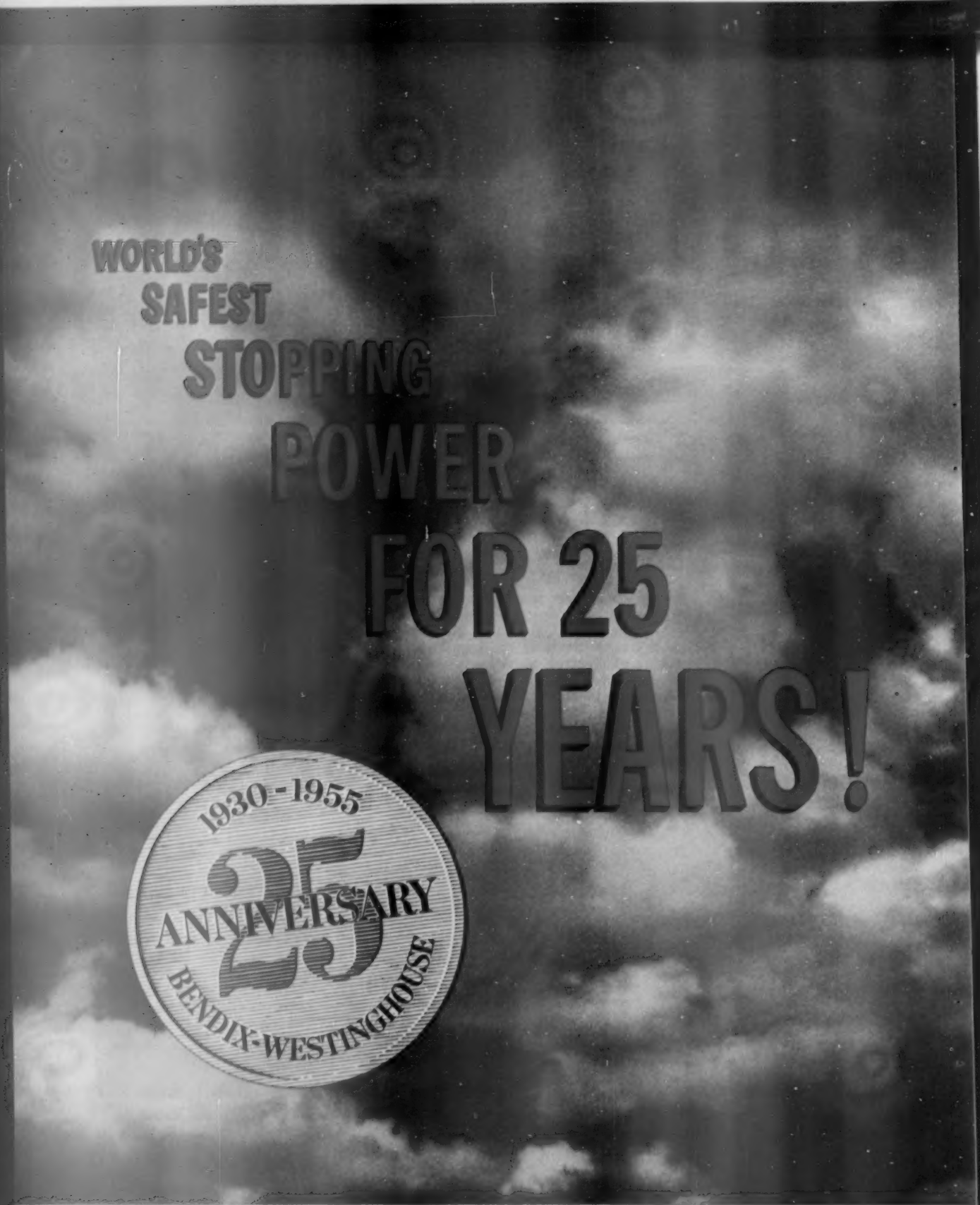
POUR easily from this disposable container, which comes in two sizes to meet every battery need.

★Listen to Lowell Thomas on CBS Radio Network—See your newspaper for time and station.

GM GENERAL MOTORS SERVICE

A General Motors Product

A UNITED MOTORS LINE

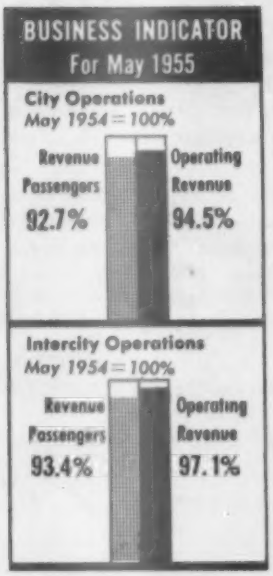


Bendix-Westinghouse AIR BRAKES

BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE COMPANY • General offices and factory—Elyria, Ohio. Branches—Berkeley, Calif. and Oklahoma City, Okla.

Top Topics

BUS Transportation



NAMBO is urging all carriers to help fight a provision in the Gore bill (S. 1048) – a provision which would be disastrous to interstate bus operators. It would deprive any state within the boundaries of which the National System of Interstate Highways is located of federal funds if it permits operation of any vehicle larger than the limitations in such state on July 1, 1955, or larger than the 96-inch width recommended by the Association of State Highway Officials in 1946.

Since the industry is now fighting for bus widths of 102 inches, passage of this bill by the House would have serious consequences. NAMBO requests all members to correspond with members of the House Committee on Public Works, now considering the measure – especially members who come from operators' home states or Congressional districts.

New York's five-man non-salaried Transit Authority will step down July 1 after three rocky years, replaced by a three-man paid board chosen by Governor Harriman and Mayor Wagner.

Appointed were Joseph E. O'Grady, former city labor commissioner who was Wagner's choice, and E. Vincent Curtayne, senior trust officer of the Manufacturers Trust Co. Joseph J. Stein, assistant VP of the Chicago and Northwestern Railroad was expected to become chairman.

While New York's municipal lines await their new boss, independent operators and the unions representing their employes have named a committee to attack traffic problems. Working with Traffic Commissioner T. T. Wiley and impartial transit adviser Theodore W. Kheel, the group will explore every possibility, even "fantastic" ones such as left-hand doors on buses and restricting Fifth Avenue to bus traffic alone.

Fair exchange is no robbery and that's what the mayor of Springfield, Ill., has proposed. In return for $70,000, which the city says the Springfield Transportation Co. owes it for gross receipts taxes for the past two years, the city would slash the four per cent tax in half under Mayor Nelson Howarth's proposed ordinance.

The yearly obligation of the company would be reduced from $35,000 to $17,000 – a more suitable figure, bus company president Carl E. Davis said, although not as good as complete elimination of the tax.

It appears that the Los Angeles Metropolitan Transit Authority is a dead duck. The Los Angeles County supervisor has been asked to drop from next year's budget a $142,810 item for the authority.

LAMITA has been in existence for four years on a yearly appropriation of $250,000, but now that a bill which would have placed the authority at the head of the area's bus lines has fallen through the authority has no reason for existence.

A new home for Philadelphia Transportation Co., costing $4.5 million, will be started in the next three months and will be completed about a year from now. It will be PTC's first major construction in the past 25 years.

Continued on next page

Top Topics (Continued)

PTC will vacate ten floors it now occupies in the Broad-Locust office building . . . will centralize operations, maintenance and administration at the new location.

Site of the new plant will be on company property on Wyoming Ave. between Second and Third Streets.

Denver Tramway Corp. and the city of Denver are about to enter into an agreement ending Tram's "perpetual franchise" in that city. The reason: the old franchise was based on operation of trolley cars and coaches. . . and Tram was all diesels as of June 13.

Under the agreement Tram relinquished rights to viaducts and underpasses, as well as rails, ties and trolley overhead. . .but will not pay for cost of removal of those still on the streets. In addition, Tram is relieved of paying for damage done to the streets by its vehicles.

A giant step toward reorganization of New York's Third Avenue Transit Corp. was taken when the federal government settled a tax claim of $13,231,189 against the company for "about $230,000."

In Pittsburgh, too, a transit company saved money when the city accepted $210,000 from Pittsburgh Railways as payment of a claimed debt of $480,000 in franchise and other charges, dating back more than five years.

Voters in Phoenix, Ariz., will have balloted by press time to approve or reject the only bid to buy their municipal bus line – a $426,819 offer by American Transportation Enterprises. Marc Haas, New York, who owns ATE with Allen and Co., New York investment house, made the only offer for the Phoenix Lines.

If the bid is approved, ATE also will take over Metropolitan Bus Lines, independent service operating mostly in the Phoenix suburbs, although its terminal points are in downtown Phoenix.

Sale price for Metropolitan will be $131,250, with approval of the purchase almost a foregone conclusion.

Cleveland Transit System and Cleveland Electric Illuminating Co. are about ready to ink a 10-year contract under which CEI will provide power for CTS trolley coaches and transit system.

Neither side will reveal terms until the signing, but it is fairly certain that CTS will no longer have to pay any sort of a guaranteed kilowatt demand . . . called by CTS men a "penalty clause" in the contract.

Greyhound Corp's consolidated net income for the first three months of 1955 has been reported as $996,402 after all charges and taxes. Last year for the same period it was $350,663.

In a statement to stockholders President Orville S. Caesar was careful to point out that earnings in the first quarter normally contribute only a small part of the year's results.

The new Scenicruisers, he said, accounted for little more than 10 per cent of total bus miles, with 353 on the road at the end of March. However, an additional 347 are expected to be delivered during the rest of 1955.

BUS Transportation

Here's the 30th Annual Maintenance Issue . . .

THIS MONTH, for the 30th consecutive year BT is devoting a special issue to a subject of vital importance to our industry—maintenance . . . and dedicating it to the experts who keep the buses rolling.

The industry is proud of them—and well it should be. For the maintenance men of this industry have established themselves beyond dispute as the greatest automotive maintenance group in the world. So great, in fact, that every other automotive group looks to them for leadship.

Theirs is the responsibility for keeping buses in safe operating condition for the billions of passengers who ride buses each year. They have met that challenge. Buses are the safest vehicles on our streets and highways.

Within recent years bus maintenance men have faced another challenge—to continue doing the same job, but at the same time to cut costs wherever and however possible.

They have met that challenge too!

In big and little bus shops throughout the country, maintenance men have risen to this new demand by the industry they serve. Through experiment, ingenuity, imagination, they are finding a new process here . . . a new method there . . . always aiming to do the job better at less cost.

In this 30th Annual Maintenance Issue we have combed the entire industry to find out what maintenance men are doing to improve efficiency and cut costs. We found many new and valuable ideas in these four major fields.

SALVAGE . . .

In the first section of this special issue you'll find stories on six companies which are saving money by reclaiming parts often consigned to the scrap heap. There are large and small operations, from New England to the West Coast. They salvage everything from valve seats to entire coach bodies . . . and they all have one thing in common—they are in the business of saving hard-earned dollars.

LIFE EXTENSION . . .

Here's another area in which bus men are taking a new hard look—how to get longer life from engines and parts. St. Louis Public Service does it by starting a "longer life" program the day it puts an engine into service. Connecticut Railway and Lighting Co. does it with a unique system of limiting its buses to two quarts of water a day. You'll find their stories, plus a thorough study of exhaust valve life extension.

TESTING AND CHECKING . . .

Wherever maintenance men gather, the talk always gets around to methods of testing and inspection. A good system can save trouble and dollars . . . a bad one can cost them. Whether you use the newest in testing equipment, or believe in the old "eye and ear" method, you'll find plenty to interest you in this third section of our maintenance issue, where experts on both sides of the fence tell what they do . . . and why.

EQUIPMENT IN ACTION . . .

Because bus maintenance men are constantly experimenting, they're always coming up with new ways to use old equipment. We've got pages of pictures in this fourth section showing how shops all over the country are using their equipment. There's also a story on a brand new idea in interior washing . . . plus a special BT survey that tells what operators are doing about brake maintenance.

San Diego Rebuilds Its Own

SALVAGE

ABOUT THE BIGGEST THING you can salvage in a bus operation is a motor coach body. San Diego Transit System has been rebuilding bodies from the wheels up since 1944 and during the past 11 years has developed techniques which offer these advantages:

1. Its own body shop can build into the coaches innovations peculiarly necessary to its own type of operation

SANDING AND PRIMING ARE APPLIED to those posts which do not have to be removed. This is done after rivets are cut with an air-driven chisel to remove the belt rail. Posts that are rusted are replaced. Simultaneously, two other mechanics realign the ribs, and weld new ones to the carlines at the transom line. Then new skin is riveted over the rebuilt frame, and elastic rubber sealant is applied at the lapped joints for the purpose of waterproofing the body.

Better-Than-New Bus Bodies

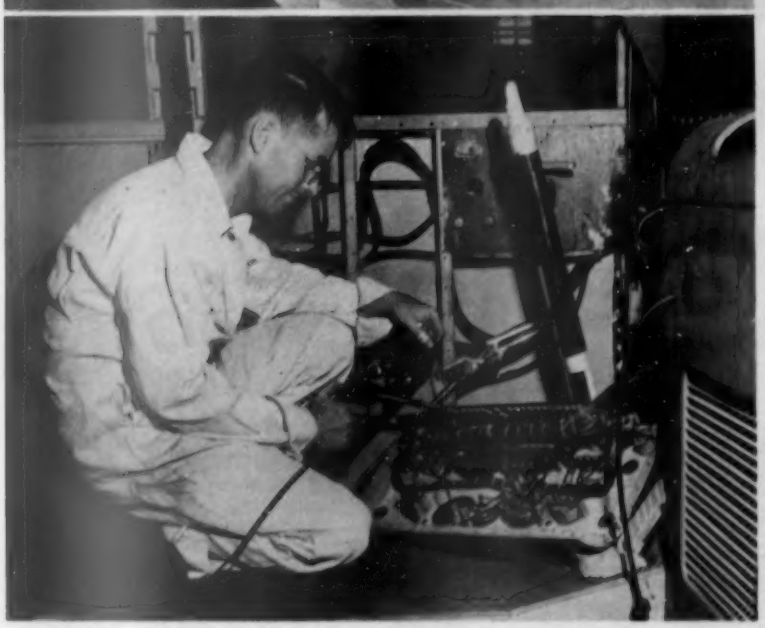
and its own type of riding.

2. Rebuilt bodies (a complete job costs about $5,000) last 20 per cent longer than the average seven-year service span of new bodies. This life span is conditioned by the fact that San Diego, as a seaport city, imposes greater corrosion on metals.

The operation is under the direction of Farell Tipton, superintendent of equipment. The body shop is headed by Fred Bogowitz, shop foreman, who was with American Car and Foundry Co. and St. Louis Car Co. for many years before joining San Diego in 1944.

San Diego's system of body rebuilding incorporates many home-grown ideas. You'll see them in action in this picture story. . . .

ALL SEATS ARE REWORKED in San Diego's own upholstery shop. Bars are sent out for rechroming, and on longitudinal seats, as shown at left, an extra bar is welded in place to keep feet-resting passengers in the first cross-seat from wearing out the edge of the longitudinal seat. Meanwhile, new glass to replace damaged panes is being cut in SDT's own shop. San Diego found that by cutting glass out of stock sheets it can cut costs—for instance $27 instead of $55 for a set of windshield glasses. The shop has a lapidary for roughing the plate, and a shop-made cleaning rack for washing the pieces after grinding.



COMPLETE NEW DASH ASSEMBLY is installed. About 500 feet of wire and 300 to 400 connections are involved in the new trunk wiring and dash assembly. Next the floor is removed with a shop-made electric heater. Usually most of the ¾-in plywood subflooring is in good condition. New rubber carpeting is then installed, with metal coving extending from the floor 3½ inches up the walls of the bus, to prevent water used in cleaning from settling in the corners and rusting off the posts.

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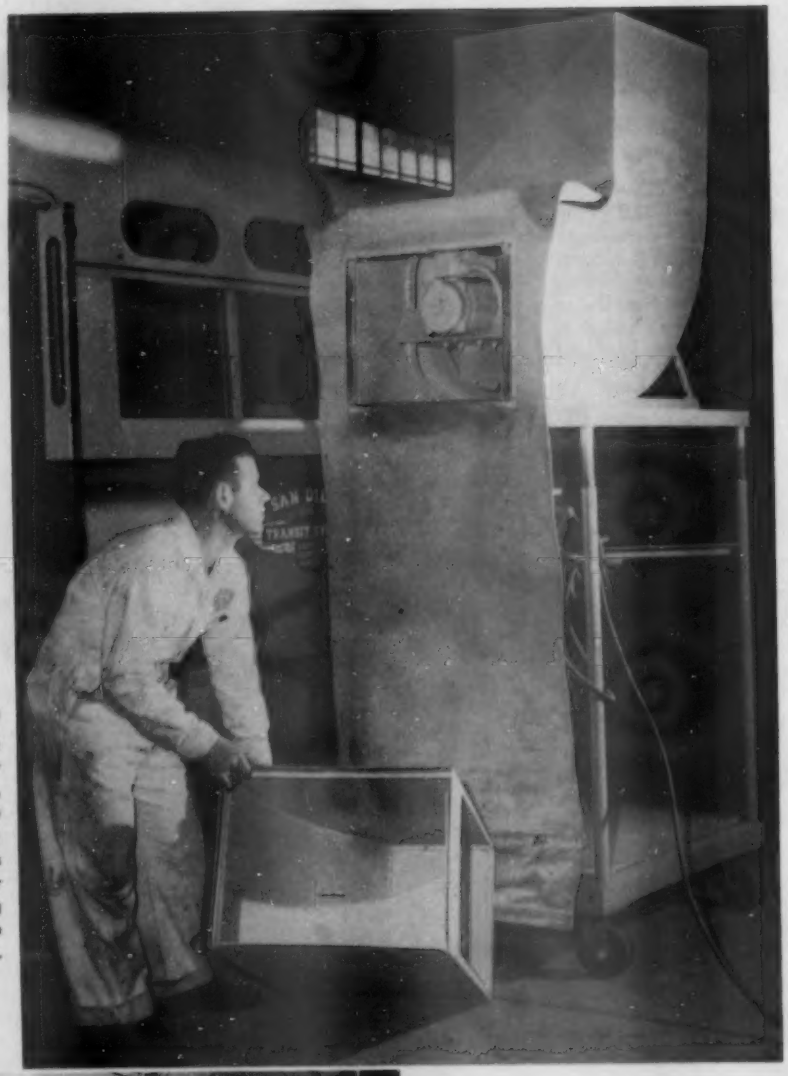


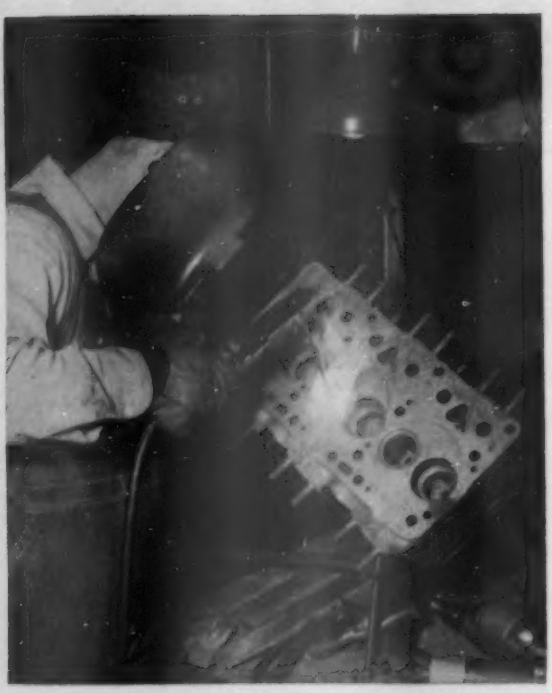
OUTSIDE SECTION of portable suction fan developed by San Diego is shown at right. It was built to air condition coach interiors during painting, and is placed at the open rear door of the coach with the nose piece (held by painter) extended through a window in a canvas cover fastened with hooks from the gutter above the door, and secured with spring loaded hooks at the bottom. A jack on the framework raises or lowers fan to fit any bus.

INSIDE SECTION of suction fan unit has a damper in the nose piece. Air selection may be made from the front or the back of the coach by opening a front or rear window and throwing the damper accordingly. The fan has a capacity of 3,500 cu ft of air per minute . . . cost $225 to build.

SHOP-MADE PORTABLE STAGE eases job of laying roof sheets, as well as other jobs. It can be put up or taken down in ten minutes . . . can be fastened at any one of three levels. SDT lays sheets lengthwise because it involves less splicing.

HERE'S THE FINISHED JOB, rebuilt from the wheels up, painted inside and out, and ready to roll with all the sparkle of a brand new coach. The rebuilt body cost about $5,000 . . . will last about 20 per cent longer than a new coach body would in San Diego.

1. Thorough cleaning with wire brush is necessary before rebuilding is begun on worn valve seats. Seats are ground and cracks veed with a chipping hammer before welding.



2. First bead of nickel is deposited on conditioned valve seat after prescribed heating period. All beads are laid downhand and kept short, from ¾ to one-in. long.

SALVAGE

What About Worn Valve Seats,

5. Nickel welded valve seat is machined to close tolerance then placed back in furnace for slow cooling. Eight heads are treated at same time. When cool, seats are reground.

THE MAINTENANCE DEPARTMENT for the 690 bus fleet of the Niagara Frontier Transit System, Buffalo, N.Y., has come up with a method for rebuilding worn out valve seats that's saving NFT a neat $5,000 a year.

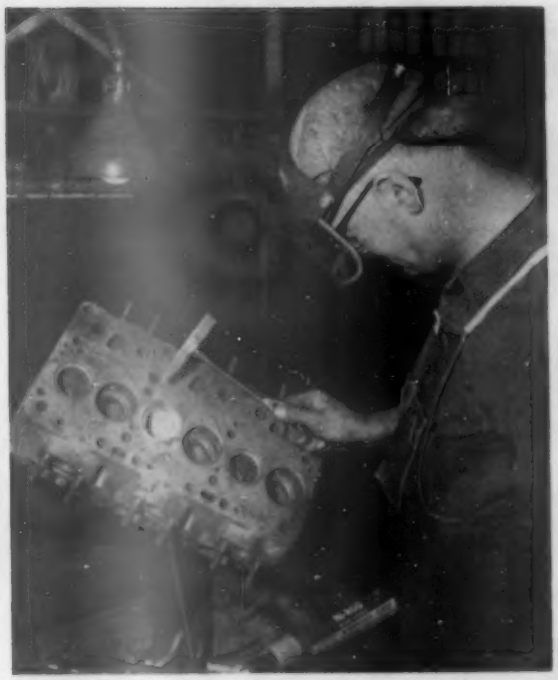
W. W. Kunz, maintenance chief for the fleet, has reclaimed 75 to 100 cylinder heads since last May when he first started using the new system.

Besides the valve seats, Niagara Frontier has also repaired an equal number of cracks in engine castings caused by broken connecting rods or resulting from routine wear and tear.

Cost of each valve seat repair job runs about $41 where a new head costs an average of $144. And Bill Kunz's experience shows that the rebuilt valve seats perform like new when returned to service.

To solve the problems inherent in cast iron welding, NFT has been using high-nickel content Ni-Rod and Ni-Rod "55" electrodes developed by The International Nickel Company, Inc. For valve seats where maximum machinability is necessary, a ⅛-in. 99% nickel electrode is used. To repair cracks in cylinder walls, jackets, etc., a nickel-iron electrode containing 55% nickel is used.

Because of the size of the NFT fleet the maintenance department keeps an inventory of eight to ten extra blocks and heads on hand and saves up damaged or worn castings until eight are ready for repair.



3. Slag is chipped away after first layer has been run in. Wirebrushing and peening with a round nose hammer follow each pass. Two or three passes are usually enough.

4. Careful inspection of rebuilt valve seats is made at Niagara Frontier with this device containing a magnifying glass and a light bulb. If valve seat is okay, seat is ready for machining.

Blocks? "Weld 'em" Says NFT

First, valve seats are ground and wire brushed. Cracks are veed with a chipping hammer and also wire brushed to ready them for welding.

The castings are then preheated for half an hour at 900°F. to burn out the impregnated oil and other foreign matter. After the oven is turned off, the castings are allowed to cool slowly to about 400°F. before they are removed.

Each head is placed in a rotating positioner during welding. On valve seats, all beads are deposited downhand. Beads are kept short, from ¾ to one-in. long; and each one is wirebrushed and peened with a round nosed hammer. Two or three passes by the welder are usually enough to build up the seat for the subsequent machining process.

Nickel-iron electrodes with a 55% nickel content are used to repair cracks or breaks in the cylinder heads or blocks. Depending on the thickness of the metal and the size of the break, NFT uses either 1/8-in. or 3/16-in. electrodes.

Postweld treatment consists of placing the castings back in the furnace and allowing them to cool slowly. All eight heads are treated at the same time. When cool, the valve seats are reground.

Repaired castings are checked for leaks by filling the water jacket with kerosene and applying air at

Continued on next page

6. Final check to reveal cracks is made by filling water jacket with kerosene and applying air under 90 psi. Dye penetrant is also used for showing up cracks.

SALVAGED CYLINDER BLOCK is ready for installation in bus after being rebuilt with high nickel electrodes at Niagara Frontier.

NFT's Wayne Tromble shows where connecting rod broke loose and went through the side of the cylinder block casting.

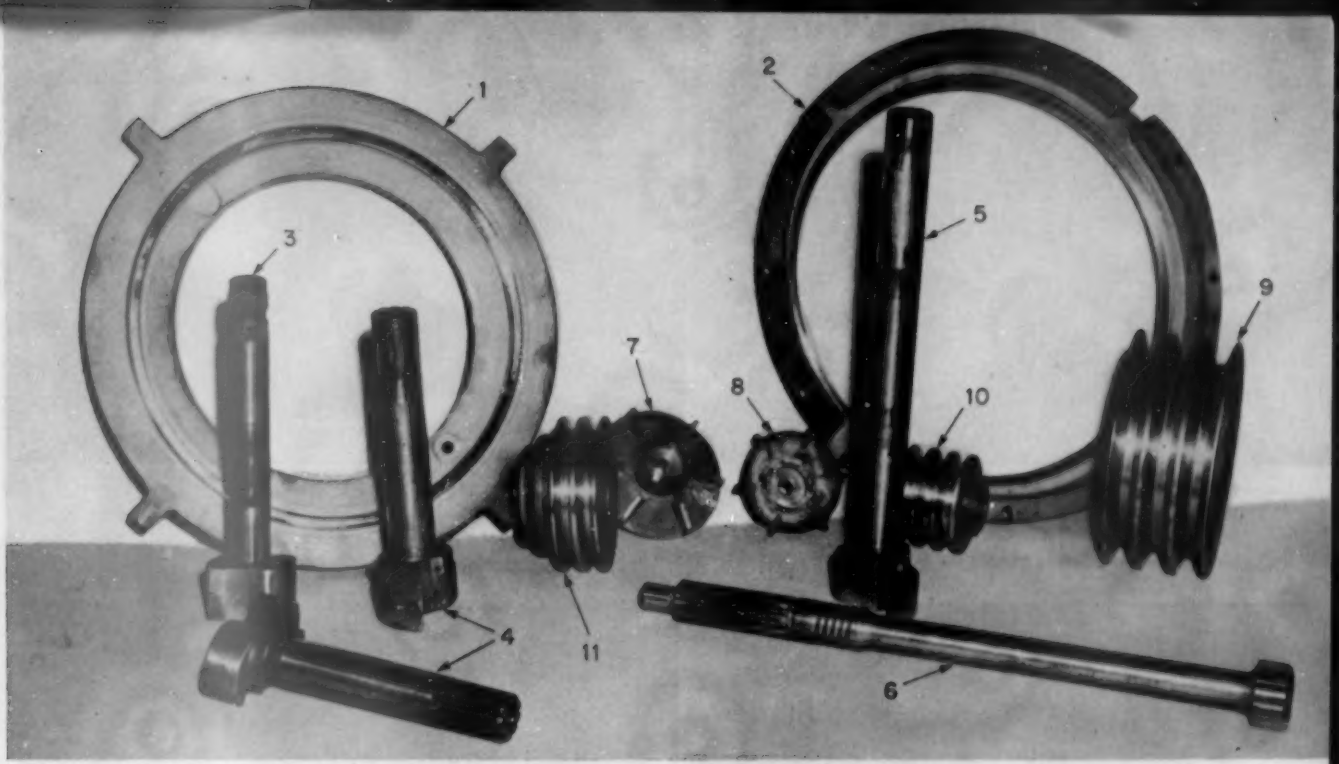
90 psi. To be doubly sure, castings are also checked for leaks with a dye penetrant.

Helpful Hints: To insure the best results, NFT has found that there are several precautions that must be observed . . .

- Preheat is necessary to obtain maximum machinability, to clean the casting, and also to speed the welding operation. If it isn't done, porosity in the metal may spoil the job.
- Watch amperage, handling of the electrode and the welding position to prevent undercutting.
- Grind the break to an 80° included angle. A wide groove allows the molten weld metal to flow or spread out over the surface.
- Don't weave the electrode from side to side; it creates excessive heat in the surrounding metal and may result in hairline cracks.

The procedure is not complicated and the method, according to NFT, should prolong average engine life to eight to ten years of gradually diminishing service. It's NFT policy to run a new bus about 50,000 miles the first year. Gradually this figure drops until the last few years of its life, when it operates only during rush hours which amounts to no more than an average of 5,000 miles a year.

BREAK IN CYLINDER BLOCK dangerously close to liner is marked with chalk for repair. Blocks are preheated the same as heads, to clean surfaces as well as to speed welding.



ALL THE ABOVE ITEMS ARE SALVAGED by Kansas City Public Service Company at a tremendous saving. Purchased new, the items in the picture would cost a total of $238.27, while the shop cost to reclaim them is only $83.95.

SALVAGE

KC Reclaims These Parts To Save Thousands a Year

THE ITEMS SHOWN in the illustration above represent the ordinary run of motor bus parts which Kansas Public Service Co. finds it highly profitable to salvage in its own shops.

Purchased brand new, these 12 items would cost a total of $238.27. The shop cost to reclaim them amounts to a total of $83.95 of direct costs.

The resultant savings on these items is $154.32. Based on the total volume of these units which KC reclaims yearly the savings amount to approximately $8,000 a year—an amount that goes a long way toward reducing shop overhead.

Below are identifications of the parts shown in the picture, with brief descriptions of how they are salvaged at Kansas City.

Items 1 and 2 are the clutch pressure and cover plates for GM type TG gasoline buses. If purchased new, these two parts would cost $81.11.

By building up worn areas with M-25 bronze and re-machining to new part specifications, these parts can be salvaged for $22.18, for a $58.93 saving.

Items 3, 4 and 5 are brake cam shafts. They can be reclaimed only if cam and splines are in good condition. The wear point is usually at the bushing seat.

To salvage them Kansas City builds them up by metalizing with 1/8 inch #80 carbon wire, then regrinding the built-up area to standard size.

Savings on one of these items alone amount to about five dollars, and since approximately 200 brake cams were salvaged in KCPS shops last year, they represented a maintenance saving of about a thousand dollars for Kansas City Public Service.

Item 6 in the photo is the through shaft for a Spicer 916 torque converter, which costs $40.23 if you buy it brand new.

The only portion of this shaft which shows wear from service is the pilot bearing surface at the small end of the shaft. KCPS salvages this shaft by removing 1/32 of an inch of the worn surface . . . then building it up by welding with 3/16 inch #6 Red Tip Colmonoy rod. Original dimensions are then restored by grinding.

This process saves $36.50 per shaft. Last year 34 of them were reclaimed, at a saving of better than a thousand dollars.

Items 7 and 8 are water pump impellers, and items 9, 10 and 11 are V-belt pulleys.

All of these are reclaimed in the Kansas City Public Service salvage program. However, only a small number of these parts need reclaiming during the course of an average year, and the savings, while relatively small, still represent a share of the $8,000 a year which KCPS saves through its salvage operations.

DRILLING OUT THE HOLE to be repaired is the first step. Nominal thread size of the insert to be installed is 7/16-14, so the hole must be drilled out with a 7/16 drill. This cleans out the old threads and provides the correct size for the tap.

NOW A 7/16-14 SPECIAL TAP is used as the mechanic performs the second step in the wire insert process. This special tap cuts an oversize thread, which is necessary in order to accommodate the steel wire thread insert.

THE INSERT IS INSTALLED with an inserting tool in the third step of the Danbury Bus Co. repair process. Note from the position of the hub in the photos that the unit is still on the coach—one of the great time savers in the insert process.

AS THE INSERT IS SCREWED INTO THE HOLE in the final step, the action of the inserting tool reduces the diameter of the insert to the size of the hole, so that it seats firmly in the threads. Total time for the operation—20 to 30 minutes.

SALVAGE

Quick Repair for Broken Studs

DANBURY BUS CORP., Danbury, Conn. repairs broken studs in wheel hubs in twenty or 30 minutes with a steel wire thread insert process known as "Heli-Coil."

Previously, broken studs in the company's 30 and 33-passenger buses were a constant problem. When more than one stud broke on a wheel hub it was necessary to (1) work out the broken studs without damaging the hole threads, or (2) braze or weld the holes and retap, or (3) redrill a new hole circle in another position.

This latter operation made it necessary to take the bus out of service for at least a full day, since the hub had to be removed from the coach and taken to a machine shop for repair. In some cases hubs were designed with thin-walled bosses which didn't permit drilling a new hole circle. The only solution in that case was replacement of the hub at a cost of 40 or 50 dollars.

The wire insert process solves this maintenance problem. Its advantages to Danbury Bus Co. are apparent—because the repair is made in minutes it's not necessary to take the bus out of service for any length of time. In addition, there is an actual dollars and cents saving on the repair itself, as the former method of hub repair cost about $7.50 per wheel hub. The labor cost of installing inserts amounts to less than a dollar.

These steel wire inserts will permanently restore damage threads to original size in any metal. They can be applied to spark plug holes, stud holes, and all threaded holes in engine blocks, cylinder heads and water pumps, as well as threads for drain plugs, etc.

Another advantage is the lack of equipment needed. Ordinarily, worn threads are built up by the oversize thread method, by using a solid bushing or by building up with welding. These frequently require milling, filling or grinding after the repair is made.

But Danbury's method, as shown in the photos above, requires only drilling out the damaged thread, and if necessary the broken stud, retapping the hole slightly oversize with a special tap, and winding the wire insert into the retapped hole.

SALVAGE

Two Solutions to One Problem

The question: how to eliminate the costly, time-consuming job of manually lapping hydraulic torque converter seals. The answers...

Louisville Transit Built a Machine With Two 16-Inch Drill Press Heads...

BUILT IN THE SHOPS of Louisville Transit, the lapping machine shown in the photograph at left incorporates two 16-inch Delta drill press heads.

The top head is in the normal position, while the bottom head is reversed with the spindle pointing upward. On the latter is mounted a 14-inch lapping disk made from a Ford bus engine flywheel.

Welded into the chuck of the top spindle is a holder into which the nose piece of the GM-Spicer 90 transmission seal is clamped. The holder is spring mounted so that it can seek its proper position on the lap.

The Delta drill presses were bought at a cost of $60 each; the lap and holder cost about $30 to manufacture . . . so that the total investment was about $150. This compares to some $1,200 which a standard lapping machine would have cost, but makes it possible to machine-lap seals in a fraction of the time formerly required to hand-lap them.

Niagara Frontier Transit Machine Handles Two Seals at a Time...

NIAGARA FRONTIER TRANSIT SOLVED the same problem somewhat differently. It eliminated the need for manual lapping by designing and building in its own shops the machine shown at left. The cost was just about negligible.

NFT's machine handles two seals at a time, holding the seals stationary in clamping fixtures while the lapping disk is rotated, driven by a 1/3 hp single speed electric motor through a 90-deg power take-off.

The motor speed of 1,750 rpm is reduced to 70 rpm at the lapping plate by means of a bus brake slack adjuster. Just as in Louisville, NFT now lap seals in far less time than formerly required.

WHEN TO CHANGE OIL FILTER is determined by type of service and operating conditions. PS does it every 9000 miles.

GET THE OIL SUPPLIER INTO THE ACT by letting him check carbon deposits, sludge, filters and wearing parts.

CHECK SHUTTERSTATS AND THERMOSTATS, which help keep optimum temperature and cut condensation and sludge.

OIL FILLER CAPS can give evidence of water and rust. Check valve rocker covers too, and other leakage places.

LIFE EXTENSION

St. Louis Formula for Longer

By W. E. Williamson • *Supt. Automotive Equipment St. Louis Public Service Co.*

HOW MUCH PER MILE are we spending for parts, labor and fuel? What can we do to make that figure smaller? These are questions of prime importance to every maintenance man.

Whether we prefer gasoline, diesel or L.P.G. power makes no difference in this article. Certainly there have been amazing strides in all three. Regardless of the type engines we operate, as maintenance men our responsibility is the final figure on the cost sheet.

Ten years ago in St. Louis, our engine cost for parts—labor and fuel was $.044 per mile. Today it is $.052 per mile, an increase of only 19%. This in spite of a 27% increase in parts costs, a 103% increase in labor rates, and a 79% increase in fuel cost. The maintenance department can take a measure of credit for that achievement but the lion's share goes to the manufacturer for supplying us with a better product. Our problem is to get the most out of this improved product. How do we proceed?

When The New Coaches Arrive • Starting from scratch, let us assume that a fleet of new coaches has been received—they have been given a careful pre-service inspection, and have been put in service on lines to which they are suitable in horsepower and performance. The things now to consider are fuels and lubricants and their effect on engine life.

Call In Fuel Supplier • Right here I would call in the fuel supplier and discuss in more detail our objective of longer engine life. Is he just barely meeting our fuel

WATCH THE AIR CLEANER carefully, as improper handling or a loose connection allows dust into the engine.

KEEP HEAD GASKETS TIGHT, for trouble often starts here. See that head studs are tightened to specified torque tensions.

Engine Life

specs? What about octane—centane—sulphur—distillation range, etc.? In St. Louis we get a brief analysis report of each month's fuel shipments, and this gives us the assurance of uniform quality.

How Often To Drain • And what about oil drain periods? These vary around the country anywhere from 2,000 miles to 12,000 miles per drain on the same makes of equipment and in similar services. What becomes of the unburned oil additives on a 12,000 mile drain period? Do they form harmful deposits in the engine?

By the same token, can you afford to change the oil every 2,000 miles, spending perhaps $160 for oil changes alone in 100,000 miles? The cost of oil changes ordinarily is almost negligible in the overall cost of engine maintenance—but when you add the cost of filters and increased labor in more frequent changes, then you may find that short interval oil changes are costing more than they are worth.

These are questions which only you can answer, based on local conditions, but also I would get the oil supplier to take an active interest in finding these answers. Let him see every engine you tear down. Let him check for sludge, varnish, combustion chamber deposits, oil filter cartridge condition, etc. These things tell a story. He should accept his responsibility and help you interpret that story.

Careful Inspection Vital to Life Span • Assuming that you have a well equipped shop and competent repairmen, I would next concentrate on setting up a real preventive maintenance inspection procedure geared to the manufacturer's service manual and tailored to your operating conditions. We cannot over-emphasize the importance of careful inspection and servicing if we are to extend the life span of our engines.

By careful servicing, I refer specifically to such items as engine air cleaners where improper handling, loose connections, etc., may allow dust to get into the engine. Dust is being recognized more and more as one of the chief causes of engine wear, especially in the area of top piston ring travel.

Engines Get Ulcers Too • Another important service item it might be well to touch on is the engine disease called "acid indigestion." This is usually manifested in the form of soft sludge, traces of water in the oil, condensation in the rocker cover, and possibly in etched bearings—the "ulcers" that ruin an engine. The causes of this disease are multiple. The cure is rather simple—but it needs continuing attention from your first line supervisors. Here's what they must do:

1. Maintain your shutterstats and thermostats, keep the engine up to optimum temperature.
2. Keep the crankcase ventilating system clean.
3. Look for traces of water or rust in oil filler caps, valve rocker covers and other places where it may show up.

There may be a water leak from the cylinder head gasket. You know what causes head gasket leaks! Poor fuel, engine lugging, incorrect timing and, mainly, poor installation and maintenance. A good grade of fuel and favorable operating conditions are things that *we* can do something about.

But, when we consider proper installation of a head gasket, we find ourselves right back again to the first line supervisor—the man on the firing line who can make or break a good engine by the way his mechanics work. He has to *know* that the head was cleaned and the block was cleaned before the new gasket was installed.

We could discuss details such as these from now until next Christmas and still not improve our engine life if the men on the firing line do not apply these good practices. Let's not forget that long engine life comes not from any one thing we do. It is the sum total of all the little things, and they are all in your engine service manuals; but your supervisor has to enforce them.

In conclusion, I would leave this thought. Considering today's higher speed, higher output engines, there is real need for "higher output" in our maintenance if we are to obtain longer engine life. Today's better engines are much more complex than those of years ago—but if we raise our sights, I know we can meet that objective of "Top Value For Every Maintenance Dollar."

LIFE EXTENSION

Here Are the Main Causes

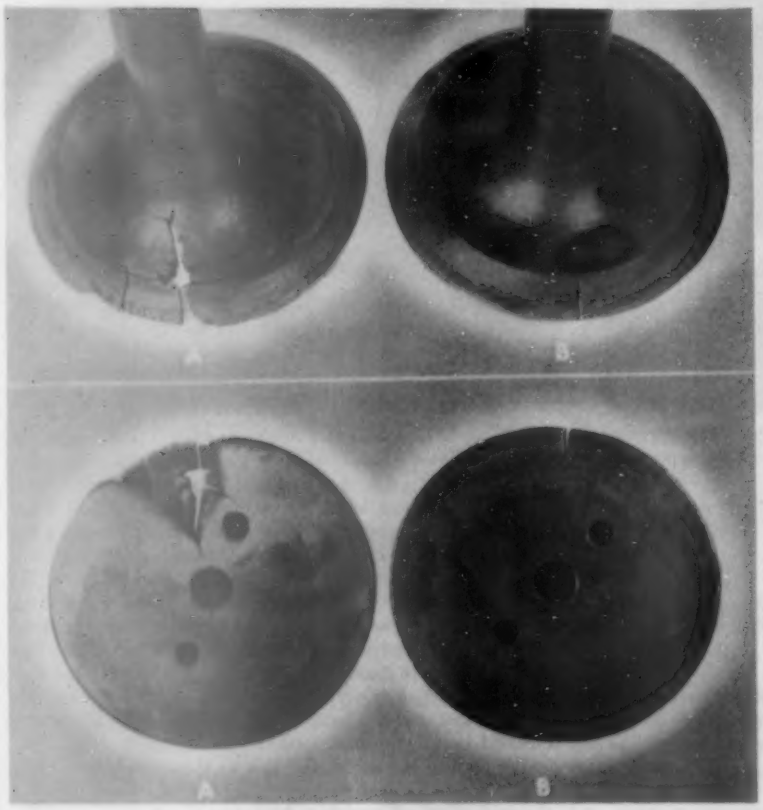
By Vincent Ayres • *Eaton Manufacturing Co.*

THIS ARTICLE, the first of two, is devoted to classifying various types of valve failure and tabulating their possible causes. We have confined the discussion, however, to those cases where the "fix" can be made in service by the operator.

It will be apparent that valve failure is closely related to conditions on the valve stem and seat, the valve guide and the seat in the cylinder head or block. Generally, therefore, one solution will not suffice, as most failure problems are a combination of several of the above causes.

It is easy, too, to see the importance of gathering data, for any clues left out mean a hole in the final jigsaw puzzle picture. It can't be urged too strongly that the existence and severity of all valve troubles be noted in any attempt to find their causes and their cures.

The photographs selected for reproduction with this article have been chosen to represent typical valve failures in each category, and while they may appear to be extreme, they occurred in actual operation.



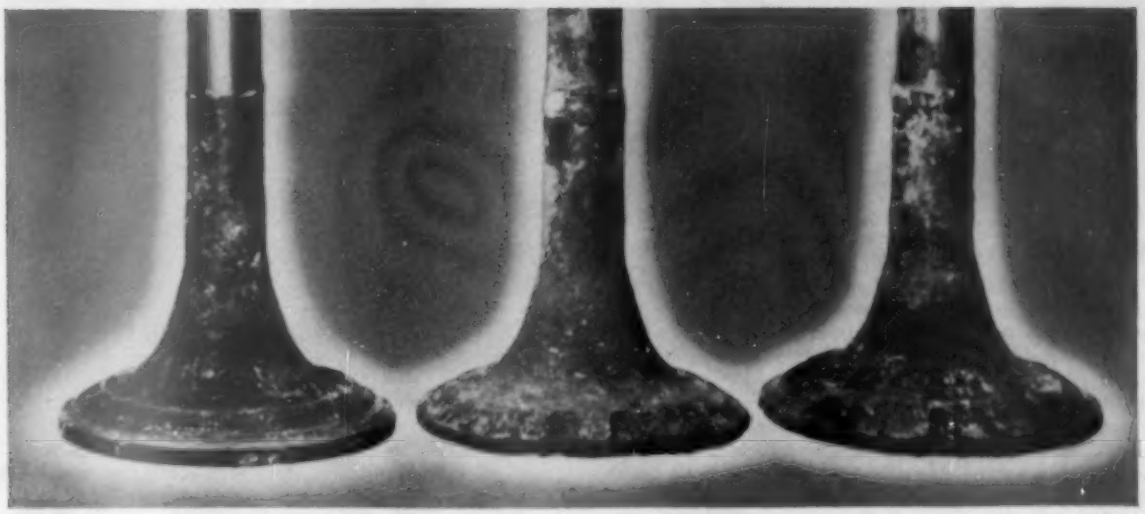
Local Seat Leakage Failure

The example above shows the importance of cooling obtained through valve and seat contact. The leakage area is quite pronounced, and is readily seen by the difference in the amount of corrosion occurring on the base metal of the valve. On valve A the seat facing has suffered less from corrosion than the base material because of its higher resistance, but it still shows that even the best facing materials may be corroded away at the elevated temperatures resulting from leakage at the valve seat. Valve B shows valve face cracking from excessive localized temperatures. It has less corrosion than valve A due to difference in leakage or in the number of miles which were run with leakage present.

Guttered Seat Face

The guttered seat face shown in the photograph above is generally the result of a specific operating condition which causes the engine to preignite. This preignition results in extreme temperatures which actually melt the valve material. In some cases there will be little evidence of pitting or corrosion around the guttered area, exactly opposite to the type of failure shown in the photo at left. The valve above was the result of operation for 10½ hours under known conditions of preignition, caused by using a spark plug with too much exposed porcelain. In service a hot plug, (that is, incorrect heat range,) cracked porcelain, or otherwise faulty plug may be responsible for the existence of a similar operating condition, and should be carefully guarded against.

# of Exhaust Valve Failures



Advantages of Rotation

This photograph shows clearly the advantage of rotation in keeping faces clear of deposits in comparison with a valve that did not rotate. The center and right valves were sticking sufficiently to allow deposits to build up between the valve and cylinder seat. These deposits then broke away in somewhat local areas, allowing leakage. The valves were overheating enough to suffer considerable corrosion on the valve heads, which resulted in thinner margins and more corrosion beneath the valve heads. The valve on the left continued to seat, and remained below corrosive temperatures which caused the damage shown on the other two valves.

Cylinder Seat Distortion

The type of wear shown at left may be the result of cylinder seat distortion, and may be started initially by the contact between the valve and seat in a local area. The wear then spreads around the periphery of valve and seat. In engines where no seat inserts are used, the iron of the cylinder head or block may be worn away without showing much distress on the valve. Where inserts are used, the higher hardness of the seat may transfer the wear to the valve face. In some cases, such as the one shown, this wear occurs on both parts. It is apparent from the photograph that sealing between this valve and seat must have been quite poor. The use of fuels containing T.E.L. may improve this condition, since deposits formed on the faces prevent galling or scuffing of the two materials. Valve rotation may make the wear less severe and improve sealing.

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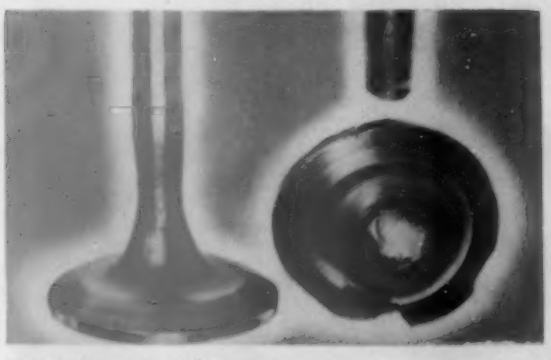
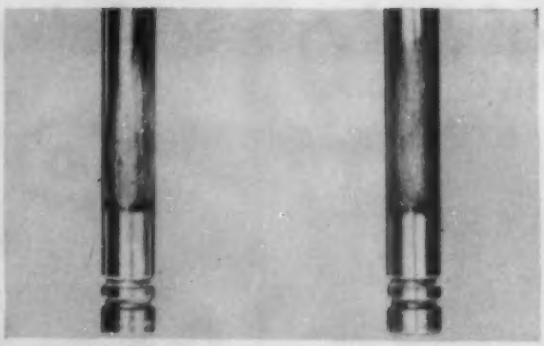


Valve Stem Necking . . .

The valves shown above had a seat facing of Eatonite to resist corrosion, and were equipped with a release type of valve rotator. Failure occurred after more than 70,000 miles of operation in a fleet where an unfaced valve without a rotator would not operate more than 15,000 miles before guttering of the face occurred. The rotation and Eatonite combination eliminated the guttering, but the distortion tendency in the cylinder head was still present. After an extended interval under high output operation the continual blast on the stem resulted in corrosion reducing the stem diameter to the point where one valve broke. Where this might occur the best procedure is scheduled maintenance so that valves having this condition can be found prior to the actual breakage. All valves with necked stems should be discarded. The correction of this problem is a function of engine design to reduce distortion, or else to reduce stem temperature at the point where the corrosion takes place through the use of sodium cooled valves in the engine.



Stem Scuffing and Wear

The stem scuffing and wear shown above is the result of operating with insufficient lubrication at one particular spot on the valve stem and guide. This was found on these valves after 7,000 miles of operation when the engine was dismantled because of valve face failure on the valve shown on the right It's difficult to say when this failure occurred, as it has been known to be present in engines after the original break-in run. In some cases it will happen, but after parts receive normal lubrication the evidence wears away, so that while stem and guide clearance is excessive, the parts appear polished. Unless oil contacts the parts soon after failure occurs, the condition will then just be one of extreme wear, and particles of the guide, in the form of cast iron dust, will generally be found surrounding the parts. This dust working into the engine's vital parts may cause other failures. It is good practice to oil parts at assembly with an E. P. (excessive pressure) lubricant, which has the ability to cling to the surface without drying out or running off.

Valve Seat Leakage Due to Deposit Formation

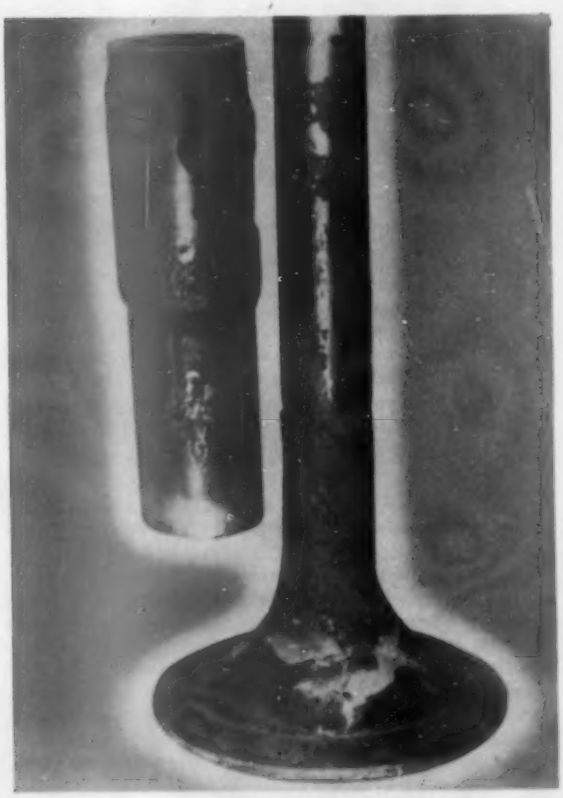
This photo illustrates valve seat leakage caused by a combination of valve stem sticking in the guide and leakage at the seat, resulting from formation of deposits which broke away in small areas. The compression pressures of the cylinders were approximately 10 to 30 per cent of normal when the valves were removed. This example also shows why a valve with a seat facing may not give longer service, since these valves were removed after the same number of hours as unfaced valves normally are. While failure is not extreme, the engine power was low, and the valves were no longer usable, due to loss of metal from the valve head next to the seat facing. The same valves, when allowed to rotate, operated about ten times as long, because the real cause of the failure, the deposits on the seat and on the stem, had been effectively removed.

Poor Lubrication

An example of poor lubrication is shown above. The rocker arm tip in this case was worn approximately 1/32-in deep—a condition which would certainly upset valve motion. It might also contribute to side thrust of the valve, thereby aggravating guide wear. Even beyond that, this condition, caused by bad lubrication, would certainly make any lash adjustment with a conventional feeler gage extremely difficult to perform.

Extreme Valve Head Cupping

Above is an example of extreme cupping of the valve head, which may have resulted from a combination of high impact, extreme overheating of the valve head, and heavy valve spring loads, causing the seat contact angle to change almost 45 deg. The valve had been operating extremely hot, and since there was no evidence of any lead deposits, it was assumed to have been operated with unleaded fuel, so that there was no evidence of heavy corrosion. If true, this substantiates the thought that the valve had been running exceptionally hot, since its material has excellent scaling resistance in an atmosphere without lead, and deposits scraped from this valve were highly magnetic. When the valve was running at exceptionally high temperatures it became more or less plastic, and the combination of various forces applied to it (inertia at valve opening, gas pressure from explosion on unseated valve, etc.) resulted in doing considerable work on the hot portion of the material. The tapered section below the head was bumped out to quite some extent, and also scaled, indicating that it had been very hot. The valve did not show evidence of sticking, so it was rather difficult to determine the basic cause of extreme overheating. As mentioned before, preignition may result from operating with an overheated spark plug, such as one with a cracked porcelain. It is known that running under preignition conditions does raise temperatures tremendously, sometimes melting a section of the valve. This is a good example of a problem which is difficult to analyze properly without possessing more data than simply the part which failed.



Stem Temperature Too High

At the left is a photograph of deposits resulting from too high a valve stem temperature for the oil being used. There was an apparent lack of heat flow from the valve stem to the guide, and from the guide to the cylinder block, as evidenced by the deposit on the outside of the valve guide. The heat was evidently trapped in the guide, resulting in excessive carbon formation underneath the valve springs at the tip end. Recent developments in oils have been a help in this regard, but the lubricant should be chosen with the help of the manufacturer of the product being used.

Next month: Handy Valve Chart

In next month's issue we'll conclude Mr. Ayres' discussion of valves by publishing a handy reference chart which lists common valve failure problems, their possible causes, and suggested cures that can be performed right in the average bus shop.

ONLY TWO QUARTS OF WATER are allowed at CR&L. If a bus takes more, off it comes until the reason is known.

LIFE EXTENSION

Too Much Water Isn't Cheap

TOO MUCH WATER isn't cheap, especially when it's poured into the cooling system of a bus. Here's a system that one company uses to check the general health of its fleet —a simple system that anyone can try.

To diagnose their condition you simply measure the amount of water they drink. Any bus which wants more than two quarts has to go in for a checkup. The Connecticut Railway and Lighting Co. has used this system for more than 15 years . . . and has used it successfully.

In all that time, mechanics have used a two-quart watering can—nothing else—to fill bus radiators. If the bus drinks the whole two quarts, and still wants more, off it comes until General Superintendent Chet Menne and his crew find out why. This system not only helps prevent cracked blocks and burned-out engines, but also acts as a barometer for the general condition of a bus, since many factors other than the cooling system itself might cause excessive water consumption.

When the "two-quart" program went into effect back in 1939 the first step was to analyze all possible means of water losses. They were:

A. LEAKS
1. Hoses
2. Heaters
3. Radiators
4. Cracked blocks or heads or blown gasket
5. Water pump

B. OVERHEATING
1. Clogged radiator or hoses
2. Incorrect valve timing
3. Incorrect spark timing
4. Low radiator capacity
5. Defective water pump, which might be impeller or coupling sheared off, or a low capacity at low speed
6. Improper opening of radiator shutter, which could mean that the shutter cylinder was not working or the thermostat was defective.

C. NATURAL CAUSES
1. Overflow due to expansion of water and pump turbulence
2. Evaporation due to outside temperature
3. Evaporation due to water temperature.

It was immediately evident that the items under headings A and B would cause no leakage if the bus was in perfect operating condition. So the next step was to determine how much water you could expect to lose due to the items under heading C—natural causes.

Taking the three natural causes of water loss, CR&L figured it out this way . . .

Overflow due to water expansion depends on the difference between operating temperature and the temperature of the water in the cooling system at the time water was added.

Overflow due to pump turbulence is negligible in a well-designed system.

Evaporation due to outside air temperature occurs only when the bus is in storage, not when it's operating. But even on a hot night this type of evaporation is a negligible factor for periods of less than a full week.

Evaporation due to water operating temperature depends not only on the operating temperature, but on the surface of water exposed to the air and the relative humidity of the atmosphere.

Further tests were made to determine just how much water might be lost from natural causes, taking all these factors into consideration.

A radiator was filled with water at a temperature of 60 deg F. until the water just overflowed. The bus was then operated until the water temperature reached its stable operating point—180 deg F. After ten minutes of operation at this temperature it was found that one quart of water had been discharged through the overflow pipe . . . and no more water loss occurred during the next half hour.

The bus was then put into operation for 14 hours on a summer day. At the end of the run it was found that it needed almost one quart of water to fill it to overflowing. This was the amount lost due to evaporation during the operating period.

Next the bus was allowed to cool, and it was found that the radiator needed another quart to fill it to overflowing, due to the contraction of the water as it cooled. This quart was the quart lost at the beginning of the operation because of expansion and turbulence.

Altogether, the test indicated that about one quart of water was lost during a day's run. Since buses were watered just after coming in from the run, it was really not necessary to allow for expansion. But to make certain that limits were not too tight . . . and to compensate for cases where a bus was watered when cold . . . it was decided to set two quarts as the maximum water quantity permitted for each day's operation.

Anything over two quarts, obviously, must not be due to natural causes, but must be attributed either to a leak in the system or to overheating caused by one of the defects previously listed under heading B.

Those defects, if not corrected, could well lead to a cracked block and a ruined engine, costing thousands of dollars to replace.

The first night the system went into effect on CR&L almost 100 out of 300 buses couldn't meet the two-quart water requirement and were pulled out of service to be checked.

Less than a year later the nightly average was two to three per cent of the fleet, and it has stayed at about that figure ever since.

The system functions successfully only if attention is paid to the slightest details. Servicemen report a bus at CR&L even if it takes only half a pint over the two-quart maximum. And most important, once a bus has been reported it cannot leave the garage until some defect which could account for its thirst has been found and corrected.

Procedure for doing this is the obvious one. Mechanics first check hoses, pumps and gaskets for leaks, preferably when the engine is cold. Oil filters are inspected for emulsified oil, indicating a crack in the cylinder block, head or head gasket.

If the defect doesn't show up there, shutters and thermostat operation are checked, and the radiator is inspected for closed tubes.

As a last resort, if all the previous points were OK, ignition and valve timing are checked.

The two-quart idea has proven its value in more ways than one. Here are some of the concrete ways in which it has saved time, money and trouble at CR&L . . .

1. It eliminates continual checking for leaks on hoses, hose clamps, pumps, etc., as you know that if the bus doesn't take more than two quarts of water it cannot have a leak. This is a great saving in time . . . and consequently in dollars and cents.

2. It provides a constant check on the shutter system. If the system is operating in such a way as to cause cylinder head temperatures to go over 180 deg F., but not high enough to sound the warning signal, evaporation will take more than the usual amount of water—say three or four quarts a day. Under the two-quart system you don't have to tie a man up on the job to get this constant shutter system check—the regular service man provides it.

3. It permits detection of slight cracks in the block or head before they become larger cracks and develop into road failures.

4. It means better bus operation and greater economy. If the spark timing is retarded, or valve timing is incorrect, the bus will overheat and use more than the usual amount of water. When it's pulled out because it's extra thirsty, a mechanic, finding no leaks or shutter troubles, will check engine and ignition timing and spot the trouble.

5. It detects clogged or dirty radiators. If nothing else seems to have caused the excess water loss, it can be assumed that the radiator is not operating at correct capacity due to clogging. A partially clogged radiator gets worse and worse at a fast rate, due to the ever-increasing load put on the still open tubes, so that the sooner the trouble is remedied, the better for the bus. If a vehicle goes on a long trip with a radiator partially clogged, the whole engine is put in danger. The two-quart system is especially good for locating defective radiators, as it detects clogging at the time it first starts to affect the cooling of the engine.

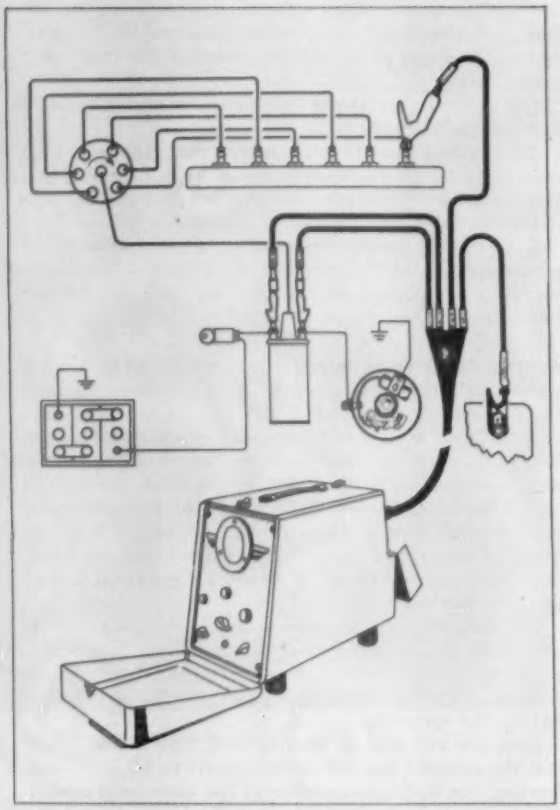
Judgment must be used in applying the system, naturally. If three quarts of water have been used, for instance, the probable trouble is a leaking hose, or incorrect thermostat temperature, or a retarded spark.

But if you have to replace ten quarts you know that there has to be a tremendous leak . . . or a cracked head or block.

Some items, such as a radiator of too low capacity or a poorly designed pump, are not easily correctable. In those cases, then, the thing to do is set a water limit not at two quarts, but at some other maximum determined through study and experimentation.

If judgment *is* used, however, and if servicemen are taught to report a bus even if it's only half a pint over the maximum you set, the two-quart system can become one of the simplest—and most valuable—methods you have of checking the condition of your fleet.

EASILY HANDLED IN A BUS, this cathode ray analyzer is being tested in a Manhattan Transit Co. vehicle by Carl Whittaker, shop foreman, and mechanic Gus Grassano.



TO HOOK UP ANALYZER only four connections are necessary. One connection is made to the number one spark plug, another to ground, and two to the primary connections of the coil.

TESTING AND CHECKING

Engine Ignition Performance

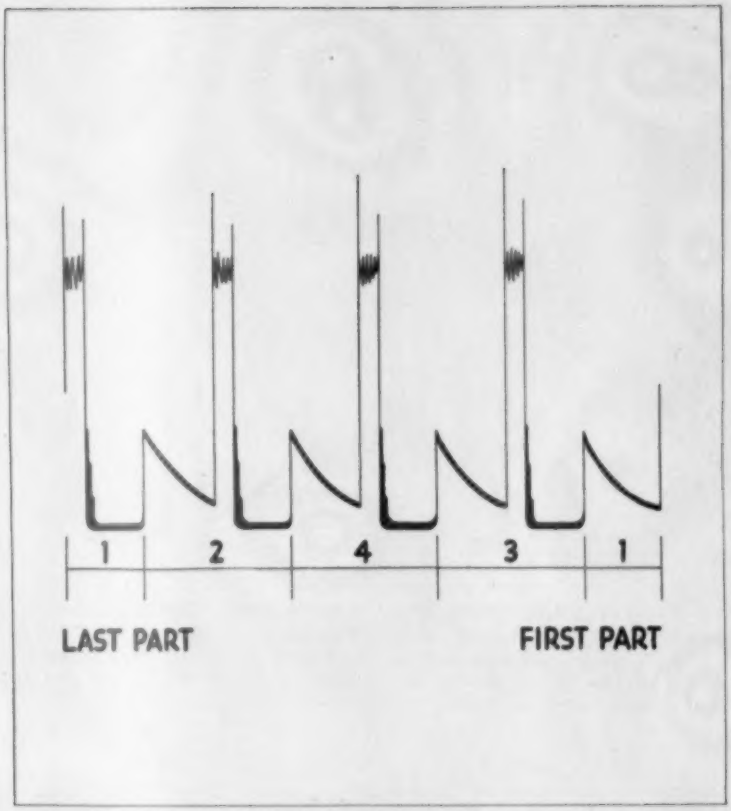
AN ELECTRONIC INSTRUMENT employing a cathode ray tube similar to the picture tube in a television set, which looks into the innards of the engine's ignition system and tells what's happening under actual operating conditions, is a new tool for the automotive ignition expert.

Known as oscilloscopes, these electronic ignition analyzers provide a visual trace or image of the complete ignition cycle on the cathode ray tube screen in much the same manner an electro-cardiograph measures and registers the movement of a human heart. And as the cardiograph indicates any deviation from normal heart action, so the oscilloscope puts a scientifically precise finger on any departure from normal action in the ignition system.

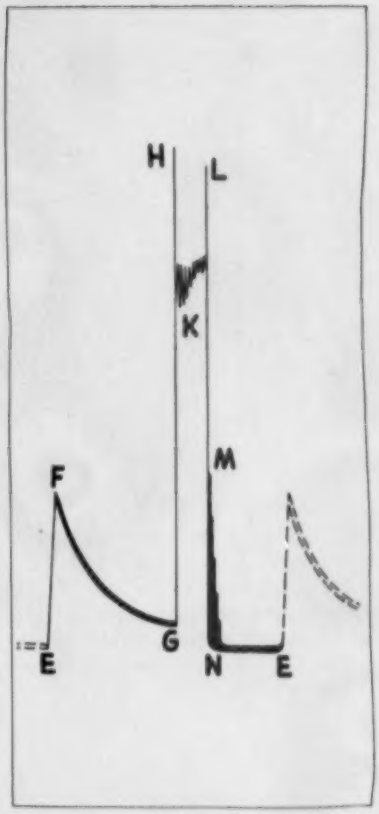
Although the cathode ray oscilloscope has been used for many years in radio and kindred services for observing and interpreting electrical phenomena and mechanical operations capable of conversion to related voltage or current variation, its application to the automotive field is comparatively recent. For a number of years some of the large oil companies have employed oscilloscopes as laboratory apparatus. Recently, a number of oscilloscopes have been offered, some of which permit use in the automotive electrical shop. Others are strictly for laboratory use.

Whether for laboratory use or for service in the field, these cathode ray tube oscilloscopes employ the same principle, namely, the use of a visual trace or image of the complete ignition cycle to show, by characteristic changes in the image shape, sustained or intermittent faults.

An oscilloscope specifically designed for use as a portable ignition analyzer and which operates on the 6, 12 or 24-volt power supply of the vehicle being tested, has been developed and is being produced by Joseph Weidenhoff Inc.



TYPICAL ENGINE "CARDIOGRAPH" of a four cylinder engine as seen on the screen of the cathode ray analyzer, showing the relation of images and cylinders. Engine fires in 1-2-3-4 order . . . and images show up on screen in the same sequence.



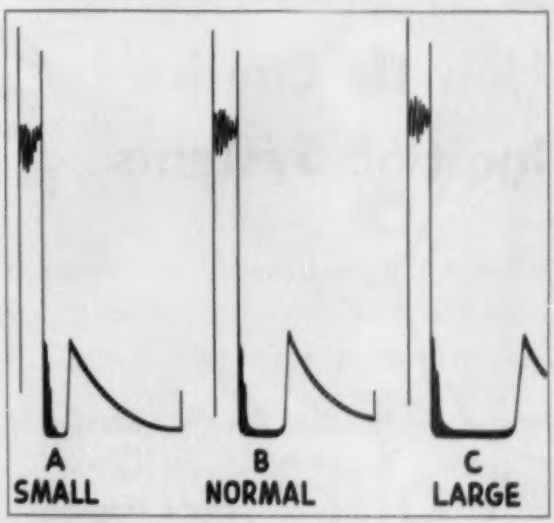
KEY TO IMAGE SHAPE—At point E contact breaker points close and remain closed until G, when they open. At H spark plug begins to fire, continues at K and stops firing at L. LMN is wasting away of voltage in circuit. At E the cycle commences again.

on a TV Screen

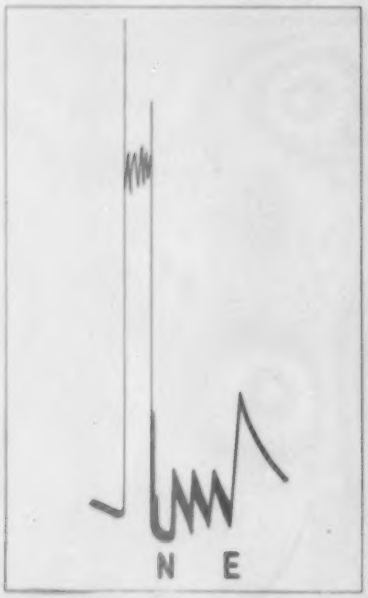
Operation • In operation, the analyzer is coupled to the engine ignition system through four connections; two to the coil and one each to ground and to any spark plug. The engine then is started and after a short interval the image shape for each firing cycle appears in firing order from left to right on the screen. Ignition cycles for all cylinders are shown on the screen at one time and, being recurrent, the images appear to be stationary.

From the shape of these images, it is possible to detect such faults as defective insulation of ignition wires, distributor head and rotor arm, faulty condenser action, poor electrical connections, contact breaker faults including incorrect gap, weak tension springs, ignition coil and spark plug defects, as well as compression effect of valve action. Although primarily for shop use, the analyzer can be used for road testing also.

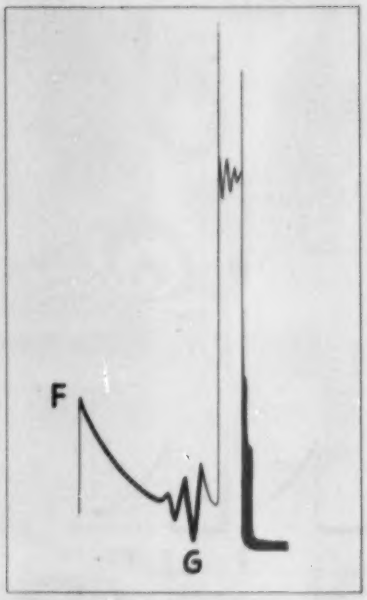
Typical image patterns and what they mean are shown in accompanying illustrations. ***Continued on next page***



CHANGES IN GAP SETTING of contact breaker points as indicated on the oscilloscope. Center shows normal gap, while at left it's too small and at right too large.



FAULTY COIL CONNECTIONS are shown by pronounced oscillation at N-E, indicating bad battery current supply to ignition switch, trouble in the switch, or in the wire from switch to coil.



POOR PRIMARY CONNECTION is indicated by oscillation on normally smooth F-G curve. It means a loose or corroded connection between ignition coil and primary terminal on distributor housing.

DIRTY BREAKER POINTS are shown by a thick line at G, blobs on line G-H, and oscillations on line E-F. It indicates that contact points are dirty, pitted, or otherwise making bad contact.

TESTING AND CHECKING

A Mechanic Tells How He Checks Ignition Systems

When testing instruments aren't readily available, plain know-how can solve your ignition problems in a number of cases . . .

We asked The Old Timer, whose timely tips in our March issue were so well received, to tell how he does it with simple tools available in any shop . . . a rag and a flashlight . . .

THIS IS A STORY WITHOUT PICTURES, because I'm a mechanic writing to mechanics . . . and you don't need any pictures or sketches to understand what I'm going to say about ignition.

First of all, cleanliness is half the battle on any job, and since it's no great chore to do it—and a decent job can't be done with the distributor unit on the engine—the first thing on the program for good ignition work is to remove the cap and let it hang on the spark plug cables. Then remove the unit and drop it intact in a bucket of cleaning fluid.

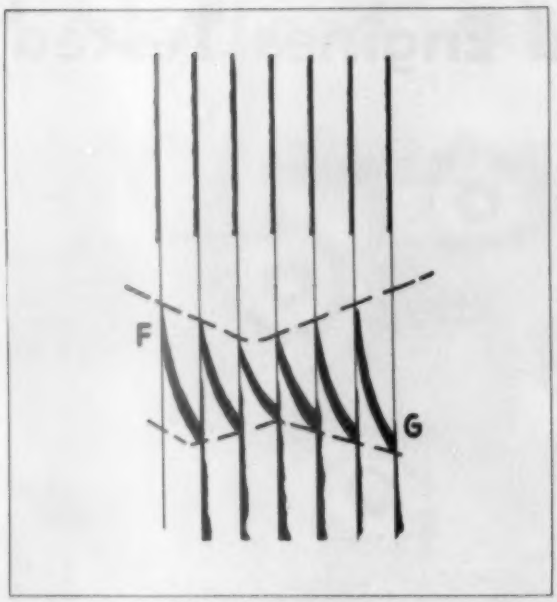
Much time can be saved, especially on gear-driven units by noting the position of the rotor before the unit is removed, so that you can put it back at approximately the same time setting as when it was taken off. I say "approximately" because the engine definitely has to be retimed after any work is done on the distributor, even if it's only replacing points.

With the unit still soaking in the cleaning solution, the next step is to

Pull the cables off the plugs. It should take a slight pull to get the clip off the plug terminal. If any of the cables practically fall off in your fingers, the clip should be squeezed up with a pair of ignition pliers until you need a good snappy push to put it on the terminal.

Go over the plug terminals with your ignition pliers to be sure they're tight on the plug—it's a common occurrence to find a terminal which is unscrewed inside the clips.

Check the condition of the cables, and replace them where necessary.



CAM ROTOR SHAFT DISTORTION is shown above. Picture length is reduced to a minimum to show how this condition is represented on the screen. Dotted lines do not appear, but are inserted to emphasize the wide variation in the length of the curve F-G as it appears on the screen for each cylinder cycle.

On removing the cap, the first thing a mechanic does is to check it inside and out for cracks . . . then wipe it clean. This next item, although very common, is often missed even by good workmen.

In the top of the cap, on the inside, there is a carbon insert, in some distributors it is part of the cap. On others it's a plug on the end of a spring. This carbon is the only part of the cap that makes direct contact with the rotor . . . so be sure that it does. You'll often find the carbon completely gone from the spring loaded type, leaving the spring alone to make a contact, which is no good.

If it's the spring loaded type you can put a new carbon in, but if it's the intact type you require a new cap.

Next is one of the most consistent sources of ignition trouble, and the one most consistently ignored by mechanics. This is corrosion and burning.

The burning generally takes place in the coil wire socket of the cap and down inside the socket where it is easily missed. Check the inside of this socket with a flashlight, if necessary, and especially if one end of the wire shows black when you pull it out.

Corrosion is usually found in the spark plug sockets of the cap. It's exactly the same type that forms on the battery terminals. It will build up till no current will pass through it, and will eat the cable on the end until there's nothing left.

When this condition is found, replace the cable. The socket can be scraped out and cleaned up, but the best bet is to replace the cap also, because once it starts the corrosion has a tendency to build up quickly. I've caught this trouble in caps that had less than 5,000 miles of use. When you spot the blue corrosion, every slight trace of it should be removed, and a light touch of grease applied to help retard it.

Go next to the coil and check into the high tension socket for burning, just as you did at the cap. Strangely enough, corrosion at this point isn't as common as at the cap, but burning is worse, especially down at the bottom of the socket.

Probe into this with a flashlight . . . if you detect the slightest burning, the coil should be replaced. Naturally, while working at the coil, you should note the condition of the primary, or low tension wires and of the terminals, and correct any defects.

Now get the distributor unit from the cleaning solution and use a cleaning brush to thoroughly clean all the grease, dirt and oil from it. Then use an air nozzle to blow it dry.

Next move the shaft back and forth. If it has enough side play to open the points on the low side of the cam, or farther than the specified opening on the high side, you need a new shaft, a new housing bushing, or both.

Open the points on each lobe of the cam. If they don't open the same distance on each lobe you have to install a new cam. Now check the advance weights for free movement and see that the springs are in place.

I'll stick my neck out a little and add that up and down play of the shaft does not mean much, and seldom is the source of trouble. However, if you think the up and down play is excessive, it can easily be remedied by using spacing washers between the drive coupling or gear and the housing.

Check the drive couplings, gears, and drive shafts carefully for wear. A sure indication of wear in the distributor drive mechanism is an engine that can't be kept in accurate time. Check it by using a timing light, getting it right on the button, then shutting off the engine. When you start the engine again and put the light on it, the timing will be off. If a timing light can't be used, or some other method of timing is preferred, the result will be the same. The engine just won't hold its timing, and the only cure is to replace the worn parts of the driving mechanism.

Another very important point to watch out for is a point stud or pin which has become loose in the distributor plate. These are riveted at one end, and when loose will let the points go in all directions.

Always check this pin. When it is loose it cannot be successfully tightened . . . it requires the replacement of the distributor plate.

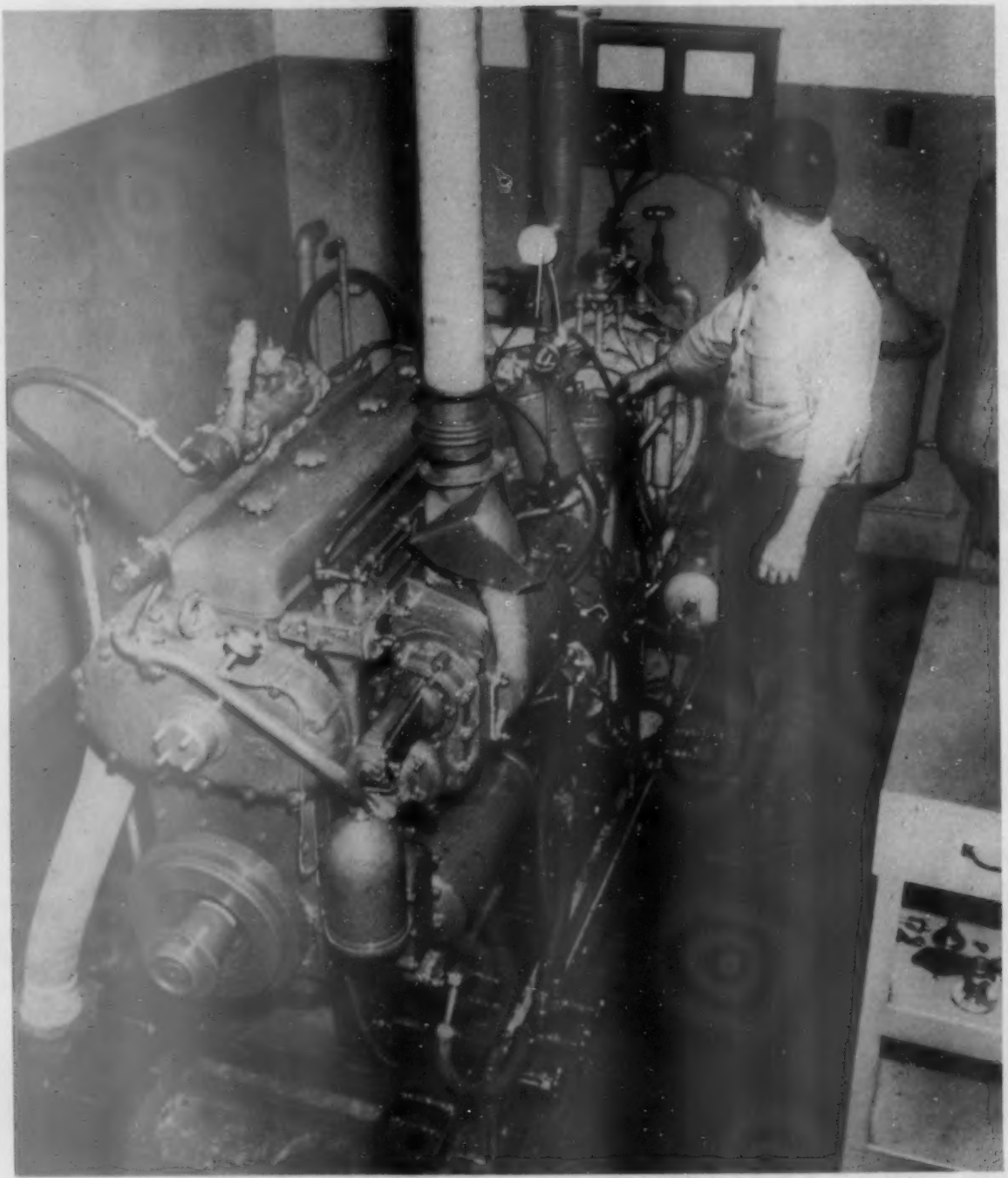
You may have found that when you install new points about seven out of ten times they won't line up. So you have to bend them one way or the other to get full contact. This can be done with a pair of ignition pliers . . . but I insist that it can't always be done by bending the stationary points only. There are lots of times when it can only be done by bending the hinged point as well.

Two types of rotor are commonly used, those with the solid brass bar riveted to the rotor and those with springs riveted to them. On the solid bar type watch out for the bar being loose at the rivet . . . an excessively burned end . . . and heavy wear where the carbon contacts the rotor bar.

Continued on page 116

TESTING AND CHECKING

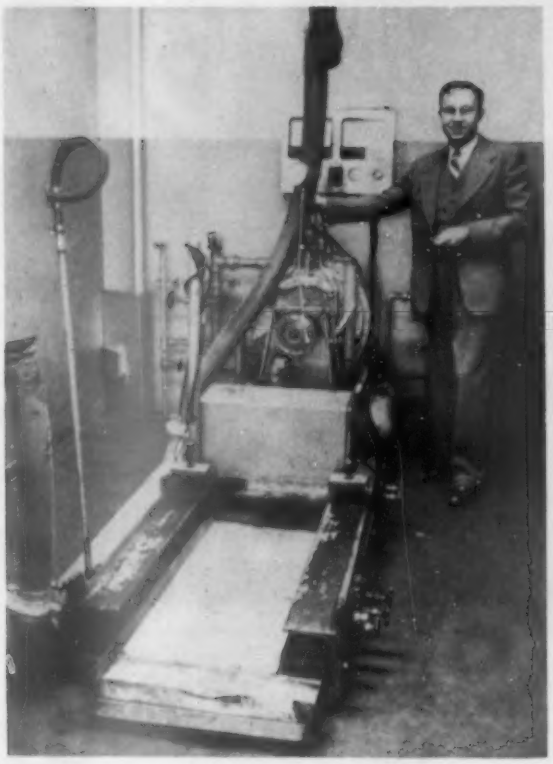
Overhauled Engines Tested



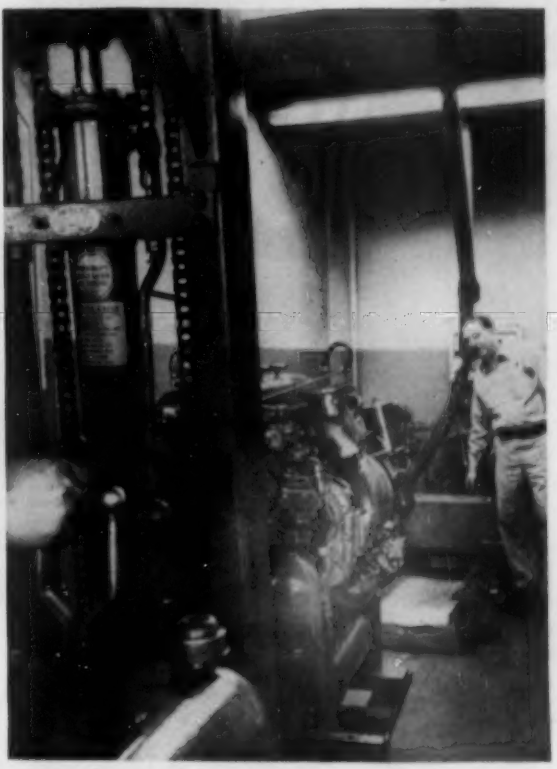
This Test Cell For Rebuilt Engines is one of three developed by Pacific Greyhound. After engine has been overhauled by the maintenance shop it is tested under full working load in this cell.

Formerly, post-overhaul testing was done with engine running free on the floor. Here Mechanic Roy Hertel keeps an eye on the dynamometer readings as he controls engine speed. Pipes leading to the ceiling are air intake and engine exhaust. Water comes through hose at bottom and escapes through outlet at top. Gages show power output, airbox pressure, oil pressure, engine temperature, fuel pressure. Any engine up to 300 hp. fits.

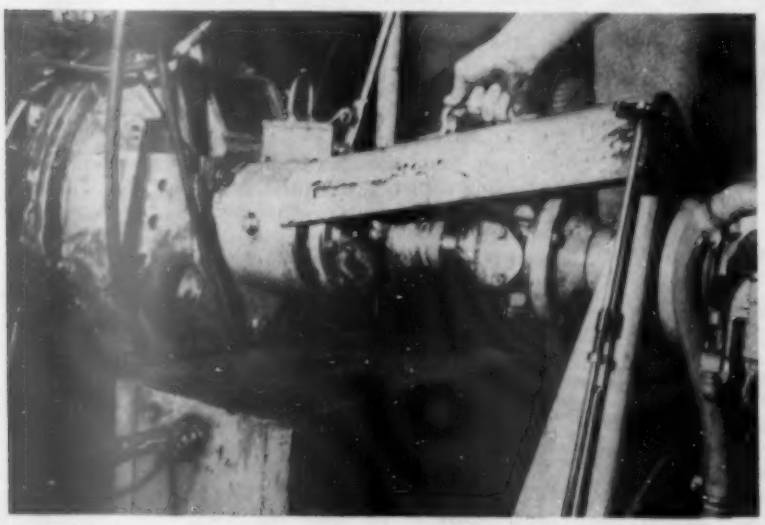
Under Load with PGL Stand



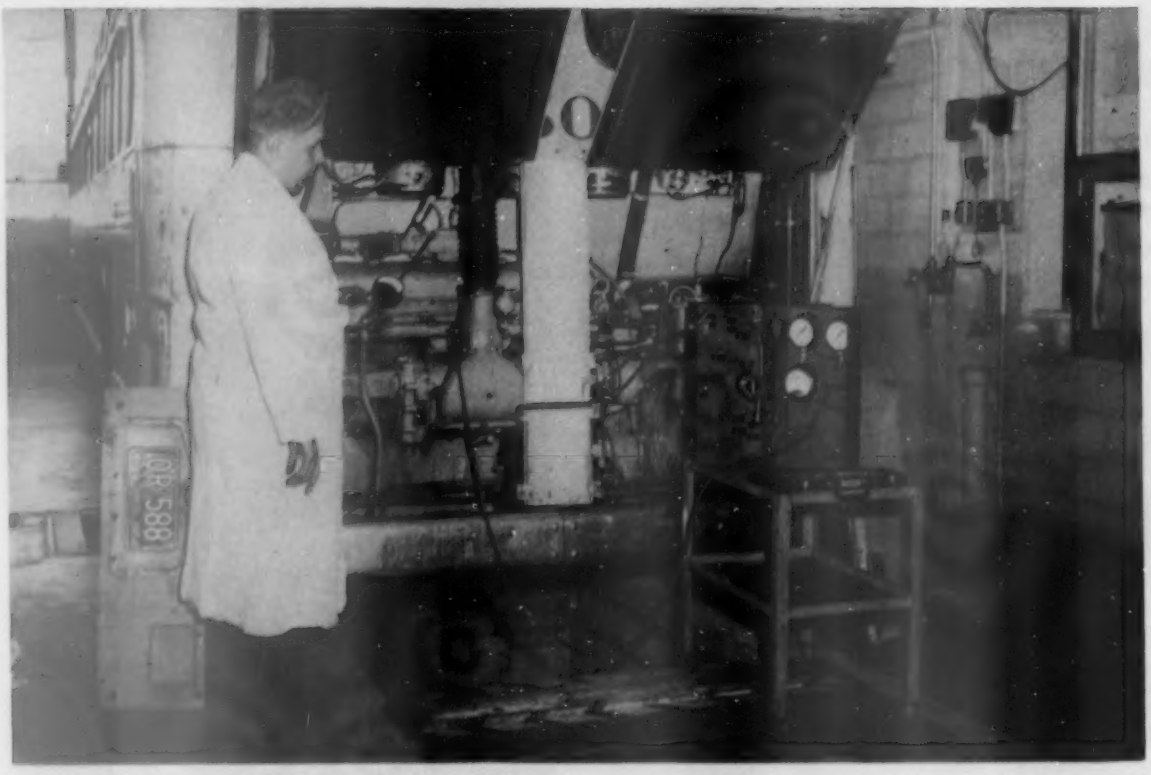
Chassis In Which Test Engine Is Mounted cushions engine and holds it fast. Frame has two sets of combination rails; top rails can be removed to fit various engines. Sound absorbing material is between rails as is pan to catch oil drip. Shown with unit is J. Brooks Rice, assistant maintenance superintendent.



Hydraulic Lift Truck installs the engine with accuracy and ease. Here Unit Department Foreman Bruno Felizanetti helps truck operator line up the engine. Walls and doors of the test cell are of sound proof material so that noise doesn't disturb light overhaul operations in adjoining area.



Universal Joint Drive Shaft connects engine to the dynamometer. Note safety cover over the drive shaft. A clutch disengages the dynamometer from the engine. This bell housing and the frame for engine are the only modifications made in the dynamometer to adapt it for test cell use. The box in the lower foreground contains battery. Testing engines—from air compressor units to 300 hp. jobs—requires approximately one or two hours.



INSTRUMENTS PLAY AN IMPORTANT ROLE in CTS inspections. Above, heat check is made with a Pyrocon while coach performance is checked on chassis dynamometer. Instruments such as manometers, stethoscopes, etc. are used for various checks.

TESTING AND CHECKING

No Place for Guess Work

BUS INSPECTIONS have been taken out of the "guessing game" category in shops of Cleveland Transit System. Contributing to the speed and accuracy of inspections are a variety of scientific instruments, one of which is the Pyrocon.

The Pyrocon is invaluable for . . .

1. Taking exhaust temperatures of individual cylinders to detect faulty injectors or improperly adjusted racks.
2. Taking converter temperature to detect improper operation.
3. Checking engine temperature at various points to detect faulty gages, thermostats, shutterstats or cooling system restrictions.
4. Taking brake drums temperatures to check whether brakes are balanced properly.
5. Checking radiator efficiency by taking temperature at top and bottom.

These "Instrument checks" are only part of a preventive maintenance plan built around a "Clinical Inspection Program" under the direction of Walter E. Davis, CTS equipment superintendent. In this program instruments are used to diagnose defects, check adjustments and determine the condition of units in the shortest period of time.

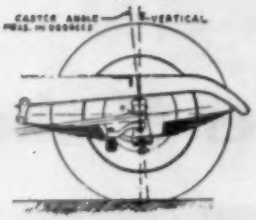
As a result of the Clinical Inspection program, the 2,000-mile inspection has become a mere "service" or quick check at which time brakes are adjusted if necessary, water added to battery and safety equipment inspected. Lubrication is left to the discretion of the foreman.

The 4,000-mile inspection likewise has become essentially a "service check" but it also includes a complete lubrication job, oil change and servicing of filters.

Among other instruments used in the Clinical Inspections is a manometer or magnahelic gage used to check exhaust back pressure, blower box pressures and for checking efficiency of asperators.

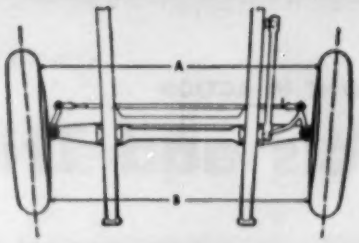
Pressure gages are employed also to determine turbine pressures and condition of fluid-circulating pumps, restrictions in fluid piping and to check the over-running clutch on V-drive. A valuable time saver is a shop-designed test board equipped with pressure gages which permits checking air brake pressure on all wheels with a single brake application.

The Clinical Inspection program is under constant scrutiny to determine if each operation is necessary or if a quicker or more accurate way of making a check can be developed. Results to date have been gratifying and encourage the belief that even further reduction in the time element of inspection will be made in the near future.



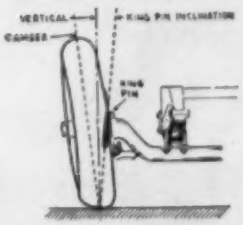
CASTER

Caster angle measured in degrees.



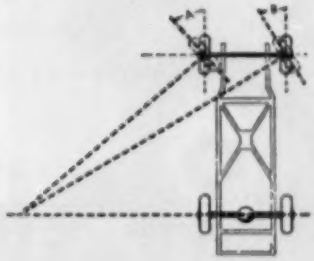
TOE-IN

Measure difference between "A" and "B" in inches.



KING-PIN CAMBER and INCLINATION

Camber angle measured in degrees.



TURNING RADIUS

Measure angle "B" in degrees when angle "A" is 20 degrees.

Motor and Trolley Bus Front End Specifications

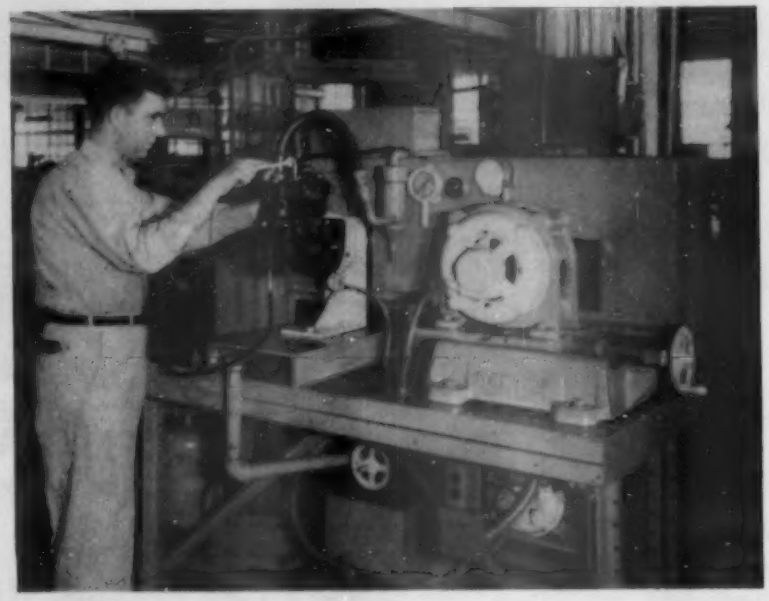
	MOTOR BUS MAKE	MODEL	YEAR	Caster Angle in Degrees		Toe-in in Inches		Camber Angle in Degrees		King-pin Angle in Degrees		Turning Radius in Degrees	
				°Max.	°Min.	Max.	Min.	°Max.	°Min.	°Max.	°Min.	°Max.	°Min.
1	ACF-Brill	IC-41A	1953	2	1	1/16	0	1	1	5½	5½	18°24′	–
2	ACF-Brill	SU-37	1953	2	1	1/16	0	1	1	5½	5½	16°47′	–
3	ACF-Brill	C-27	1948-53	1½	1½	1/16	0	1	1	8½	8½	17 5/12	17 5/12
4	ACF-Brill	C-31	1949-53	1½	1½	1/16	0	1	1	8½	8½	17 5/6	17 5/6
5	ACF-Brill	C-44	1951-53	1¼	¼	1/8	1/8	1	1	5½	5½	18 1/3	18 1/3
6	Beaver	B-35 PT	1951-55	2	0	3/32	1/16	1	1	5½	5½	20	18
7	Beaver	B-31 PT & B-27 PT	1949-55	2	0	3/32	1/16	1	1	8½	8½	20	18½
8	Beaver	B-40 PT	1954-55	2	0	3/32	1/16	1	1	5½	5½	20	18
9	C.D. Beck	Beck-29	1954	2	1	1/8	1/16	1	1	8	8	–	–
10	C.D. Beck	"Airglide" Mainliner & Deck & Half	1954-55	3	2	1/8	1/16	1	1	5½	5½	–	–
11	Chevrolet	3802	1954	1°45′	0°45′	1/4	1/16	1°30′	0°30′	8°10′	6°10′	17°45′	–
12	Chevrolet	4502	1955	2°75′ ††	–	.33	.26	°45′	1°15′	8°10′	6°10′	17°45′	–
13	Chevrolet	6702	1955	3° ††	–	.33	.26	°45′	1°15′	8°10′	6°10′	17°45′	–
14	Chevrolet	6802	1955	3° ††	–	.33	.26	°45′	1°15′	8°10′	6°10′	17°45′	–
15	Dodge	C3-FS6 & FS8-153	1955	2°	1°30′	1/8	0	2	–	7°	–	39°	–
16	Dodge	C-I-HS6	1955	2°	1°	1/8	0	2	–	7°	–	39°	–
17	Dodge	C-I-JS6	1955	2°	1°15′	1/8	0	2	–	7°	–	39°	–
18	Dodge	C-I-RS8	1955	3°45′	2°45′	1/8	0	1	–	8°	–	39°	–
19	Fitzjohn	FIG-FID-Road Runner	1944-55	2½	2	1/8	1/16	1	0	5½	–	18¾	–
20	Fitzjohn	FTG & FTD Cityliner	1950-55	2	1½	1/8	1/16	1	0	5½	–	18¾	–
21	Flxible	228JTI-551	1955	0	0	1/8	1/16	1½	1½	5½	5½	19	–
22	Flxible	218B1-54, 218B6-54, 218D7-54, 218F1-54, 218F6-54, 218F7-54, 218JBS1-54 & 182B1-53	1950-55	2	2	1/8	1/16	1	1	5½	5½	18	17 14/15
23	Flxible-Twin	FT-30, FT-33, FT-35, FT-40,	1953-55	1¼	1¼	†1/16	0	1	1	5½	5½	18	17
24	GMC	TGH 3102	1955	½	–	1/8	1/16	1	–	8½	–	17 4/5	–
25	GMC	TDH 3714	1955	3	–	1/8	1/16	1	–	8	–	17 7/10	–
26	GMC	TDH 4514, TDH-TDM 4512, 4515	1955	3	–	1/8	1/16	1	–	8	–	17 4/5	–
27	GMC	TDH, TDM 5105	1955	3	–	1/8	1/16	1	–	8	–	18 1/10	–
28	GMC	TDH, TDM 5106, 5108	1955	3	–	1/8	1/16	1	–	8	–	18 1/5	–
29	GMC	PD 4104	1955	3	–	1/8	1/16	1	–	8	–	17 3/5	–
30	Mack	C 49	1954-55	3½	2½	1/16	0	1	1	7	7	18¼	18¼
31	Mack	C-33 & C-37D	1947-55	3½	2½	1/16	0	1	1	7	7	19	18
32	Mack	C-41 & C-47	1952-55	3½	2½	1/16	0	1	1	7	7	19	18
33	Marmon Herrington	8 MB - 8 MC	1950-55	3	–	1/8	–	**1	**½	8	8	18	17½
34	Marmon Herrington	8 M2B - 8MC2	1950-55	3	–	1/8	–	**1	½	8	8	18	17½
35	Reo	F-126&F-122 with 31104 or 32508 Front Axle	1953-55	2	2	1/8	0	1	1	8	8	–	–
36	Reo	F-120 & F-122 with FD 900 Front Axle	1953-55	2	2	1/8	0	1	1	8	8	–	–
37	Southern Coach	S-36-DHL	1955	3½	1	3/16	1/16	1	1	5½	5½	–	–
38	Southern Coach	S-41 HF & S-45 HF	1953-55	3½	1	3/16	1/16	1	1	5½	5½	–	–
39	Southern Coach	S45-DHC	1947-55	3½	1	3/16	1/16	1	1	5½	5½	–	–
40	Transit Buses	328	1955	3	3	1/8	1/16	1	1	8½	8½	17⅛	17⅛
41	Transit Buses	332	1955	3	3	1/8	1/16	1	1	8½	8½	17⅛	17⅛
42	Transit Buses	340	1955	3	3	1/8	1/16	1	1	5	5	18¼	18¼
43	White	1144-D	1953	3½	–	1/8	–	1	–	5½	–	13***	–
44	White	1136-1134-S, 1140, 1140S, 1144 & 1144S	1950-53	3 5-6	*	1/8	*	1	*	8½	*	†28½	–
45	White	5218, 7218, 9218	1955	– 1⅛	– 1¼	1/8	3-32	1°15′	1°	8½	–	†28½	–
	TROLLEY BUS												
46	Marmon Herrington	TC-44 & TC-48	1950-55	1½	1½	3/16	1/16	–	–	–	–	–	–
47	Marmon Herrington	TC-50	1955	1½	1½	3/16	1/16	1	1	5½	5½	18	18
48	Pullman-Standard	P-S 700	1955	2 1/6	2 1/6	1/8	1/8	1	1	5½	5½	18 2/3	18 2/3
49	St. Louis Car Co.	TC-44 & 48	1951-55	1	½	1/8	1/16	1	½	5½	*	35½***	*

*– No information †– Based on Angle "A" of 40 Degrees. †– Toe Out ***– Based on angle "A" of 45° **– Camber of each wheel must be within 1/2° of each other. ††– Positive Caster.

EQUIPMENT IN ACTION

Tools and Tricks of the Trade

Here are eight different ways in which ingenuity has paid off for bus companies. In each case, it's a simple, practical idea—but one that saves time, cost or labor.

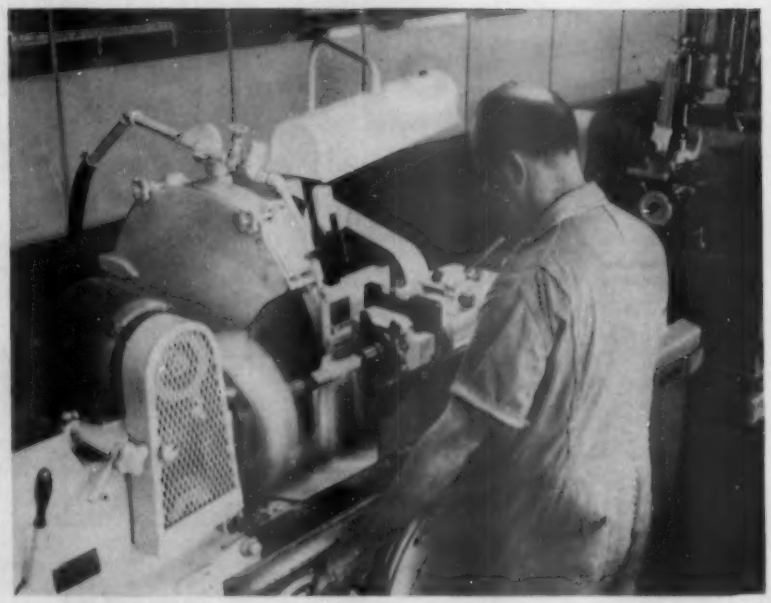


Run-in Stand Guarantees Tip-top Compressors

Reconditioned air compressors are run in on this special test stand at the Louisville Transit Co. before they are installed. This means that compressors which still pump oil past the rings can be caught before damaging door controls, windshield wipers and other air equipment on the vehicle.

Built specially by Louisville Transit, the test stand has attachments which simulate actual operating conditions found on the bus.

Naturally, at the same time it is checked the compressor is broken in by running at controlled speed.



Crankshaft Grinder Does Brake Camshafts Faster

By transferring the grinding of brake camshafts from the lathe grinder to the larger wheel of the crankshaft grinder, San Antonio Transit Company has succeeded in reducing labor involved in the job by approximately one-third.

That Save Time, Temper, Money

Converter Stand Eases Repair Jobs

One setup is all that's needed when mechanics at Niagara Frontier Transit Co. use this overhaul stand for torque converters. All parts are easily accessible.

Boring Bar Trues up Efficiently

Compressor blocks and door engines at San Antonio Transit are trued up efficiently by using a boring bar. Previously, they were honed.

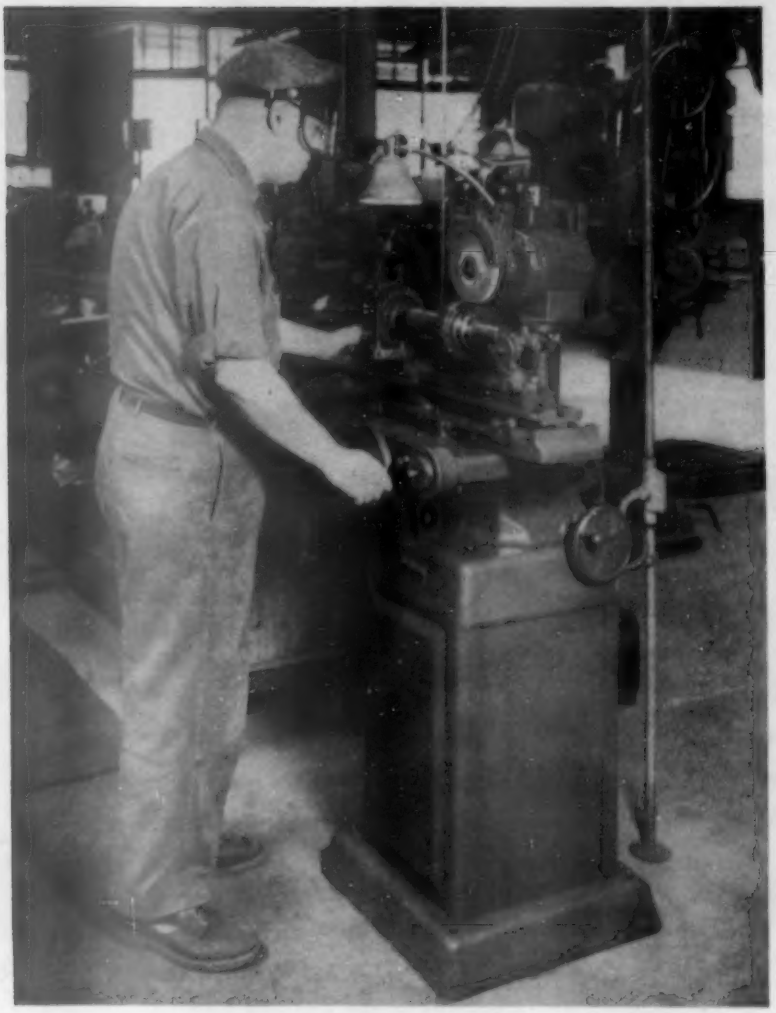
Mobile Sweeper Keeps Floors Clean as Ever

Harrisburg Railways Company uses a motor propelled power sweeper to clean shop floors and the grounds around the garage. Not only does this equipment cut cleaning time, it also does a better job.

Continued on next page

Damaged Rotor Blades Repaired Fast with Clamp Tool

Straightening damaged turbine rotor blades is done quickly and economically at St. Louis Public Service Co., where the tool above does the job. A power wrench quickly turns the screw clamp, squeezing the tool jaws on each blade. The finished product, below right, shows the fins straight, wire bound and welded.



Hydramatic Cams Reclaimed at Low Cost

Hydramatic transmission cams are reclaimed in the Connecticut Company shops at a fraction of the cost of new parts.

In the process, a mechanical transmission main shaft and gear is used as an arbor and indexing head by the machinist.

Complete Kits Cut Stockroom Visits

Complete rebuilding kits—in this case a White transmission kit—are available to mechanics at Capital Transit Co.

The parts needed for a job are simply removed from the kit, checked off on a form at the same time.

It saves the time of extra trips to the stockroom for parts, and shows the stock clerk which parts must be replaced.

Steel casters make the kit mobile, and it is simply rolled back to the stockroom when the job's done.

SOAP AND WATER ARE APPLIED. The interior is sprayed from ceiling to floor by wide-mouthed, fine-streamed hose spray. Brushes and sponges are used to soap the bus from top to bottom and in every corner and crevice, including seats and seat backs.

EQUIPMENT IN ACTION

Plenty of Soap, Water and Wax

SOME TRANSIT PROPERTIES take the same attitude towards soap and water that the average American school-boy does—cleanliness is most commendable, but decidedly inconvenient.

This is particularly true of vehicle interiors. Transit vehicles have long been prone to lumber up to the wash rack, their motors cut in a sigh of resignation and their doors opened in yawning boredom, tolerantly resigned to the rib-tickling lick-and-a-promise flick of a cleaner's cloth that so very often constitutes "interior cleaning."

UTC, in Providence, Rhode Island, decided to do something about it. Or more particularly, UTC's Utility Layout Foreman, John Devaney, decided to do something about it. As a married man of some twenty years standing, John went home and asked his Mrs. how she would go about cleaning the Devaney living room if several hundred people had been milling around it. After her violent protests had died down about "having *that* kind of party," Mrs. Devaney grasped the situation and recovered sufficiently to recommend good old-fashioned "soap and water" as the answer to John's (and UTC's) problem.

The net result is that UTC vehicle interiors have a gleam and sparkle that is definitely causing rider comment, yet the time involved has been almost halved, for UTC's interior cleaning has never been of the "lick-and-a-promise" variety. Here's how it works . . .

After the exterior has been washed, the bus is backed onto wooden blocks at the cleaning station to raise the back end several inches. Two men then remove car cards and thoroughly soak interior. That's Step 1.

Step 2—Every nook and cranny is soaped (Glamoil) manually, including vinyl plastic Koroseal seats.

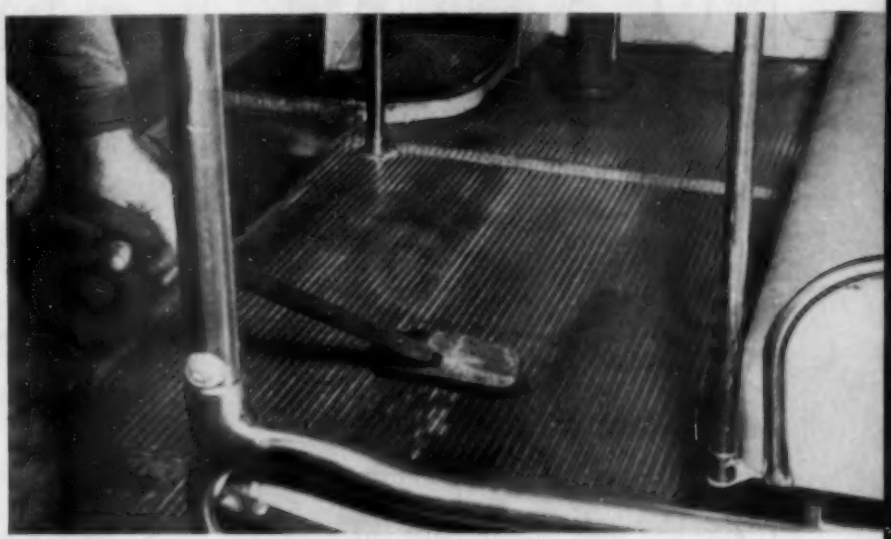
Step 3—When all dirt and grime has been removed,

SOAP IS FLUSHED AWAY with clear water spray after dirt is removed. Upholstery is hand-wiped with clear water.

WATER IN FLOOR RIDGES and pockets is removed with a Masury-Young universal power vacuum nozzle.

"DEVANEY DRYER" is now ready to slide into the bus from top shelf of its telescopic plate. It's a . . .

CONVERTED SPACE HEATER with an improvised fan blower hooked up to a steam heat pipe by a hose coupling. It finish-dries the interior in minutes so that self-polishing floor wax can be applied with a long-handled brush to give that spic and span look.



Make UTC Bus Interiors Shine

the interior is flushed with a clear water spray.

Step 4—Moist, but not dripping, the interior is force dried with what is jokingly called a "Devaney Dryer," mounted on a telescopic platform.

The telescopic platform, manufactured in UTC's shop, is wheeled to the front bus door. Rear door is closed; two rear windows are open. The drying unit, is pushed into the operator's compartment of the vehicle by a forward movement of the shelf-like top of the telescopic platform. The mount is so designed that a swivel movement of about forty-five degrees from side to side can be obtained.

The dryer is an ingenious device in itself. Actually a space heater manufactured by the Grinnell Corporation intended to supply heat to the garage, it was taken from idle stock, connected to a steam pipe by hose coupling, rigged with an electrically motivated fan-like booster, and dries the bus in a matter of minutes.

Step 5—Surplus water in floor pockets and floor surface ridges is removed through the use of a Masury-Young universal power vacuum whose tank attachment acts as receptacle for the small amount of surplus water not drained off by the vehicle's forward pitch.

Step 6—When dry, with car cards replaced, Johnson's Self Polishing Wax, applied to the floors with a long handled brush, sends UTC buses back on the road with the spic and span look of a Pennsylvania Dutch kitchen all spruced up for company.

Time-wise, a two man crew does the vehicle in something less than an hour, to which is added thirty minutes for drying the water and twenty minutes for drying the wax.

Since these drying processes require no labor, the men actually are processing two vehicles at once, and UTC's new schedule of interior cleaning is now set for eight vehicles a day—with the full treatment.

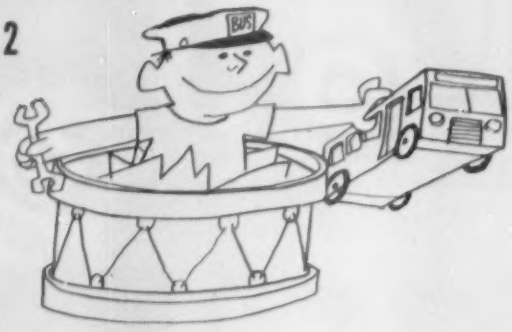
Survey Shows How Operators

1

At how many miles do you reline brakes?

Transit	Front:	Intercity
63,500	Average	135,300
150,000	High	300,000
30,000	Low	60,000
	Rear:	
39,200	Average	61,300
75,000	High	100,000
15,000	Low	25,000

2



How often do you recondition drums?

Transit	Front:	Intercity
80,700	Average	185,700
300,000	High	300,000
30,000	Low	63,000
	Rear:	
57,600	Average	136,600
200,000	High	300,000
30,000	Low	57,000

4 How much of the original drum metal do you remove before drums are replaced?

	Transit		Intercity
3/32 inch	1	1/16	2
2/16	11	2/16	2
3/16	6	3/16	5
4/16	3	4/16	1
5/16	1	5/16	1
	22 companies		11

What is the mileage life of a drum?

Transit		Intercity
207,000	Average	360,100
400,000	High	600,000
90,000	Low	175,000

5 Do you pair drums as to size and type?

Transit	Intercity
Yes - 18 (3,285 buses)	11 (1,562 buses)
No - 7 (3,602 buses)	3 (152 buses)

...grind linings to fit standard drums?

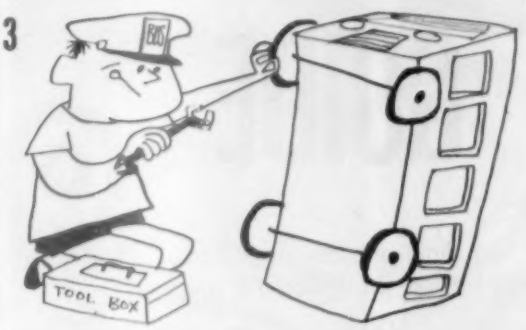
Yes - 8 (2,046 buses)	6 (1,371 buses)
No - 19 (5,058 buses)	7 (258 buses)

...grind linings to fit reconditioned drums?

Yes - 7 (1,530 buses)	7 (1,507 buses)
No - 19 (5,563 buses)	6 (122 buses)

Handle Brake Maintenance

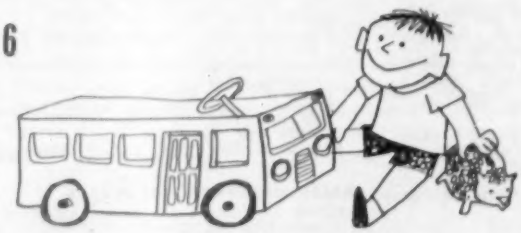
3



At what mileage are brake chamber diaphragms replaced?

Transit	Front:	Intercity
61,200	Average	225,000
450,000	High	300,000
30,000	Low	44,000
	Rear:	
52,400	Average	192,900
250,000	High	300,000
30,000	Low	44,000

6



What are your annual expenditures per bus for brake parts?

Transit		Intercity
$23.84	Lining	$37.47
7.54	Drums	11.45
4.05	Diaphragms	1.56
11.79	Air compressor parts	8.33
1.44	Air line tubing	.99
2.58	Application valves	2.56
.74	Relay valves	3.46
$51.98		$65.82

IN THIS BUS TRANSPORTATION SURVEY on brake equipment we received answers from 41 companies which operated as follows:

- TRANSIT—Twenty-seven companies owned 7,104 buses and totaled 229,767,767 miles during a year's operation, for an average of 32,300 miles per bus.
- INTERCITY—Fourteen companies owned 1,717 buses and totaled 122,851,350 miles, for an average of 71,550 miles per bus.

A study of the figures in the survey shows that many of the significant differences in brake maintenance practice result from a difference in the size of the companies involved.

For instance, 18 transit companies pair drums as to size and type, while seven companies don't. But those seven companies operate more buses than do the other 18 which don't pair drums.

Not shown in the figures at left are the surveyed companies' answers to this question: "Do you grind drums to take the next oversize lining?"

The answers revealed that among transit companies 13 grind drums for the next oversize lining, while seven reported that they don't do so.

However, the 13 which do such grinding operate a total of 4,338 buses, or an average of 333, while the seven which don't operate 1,489 buses, for an average of 212 vehicles each.

Fourteen intercity companies, with 2,776 buses, said they grind drums to the next oversize lining, and five companies, with 122 buses, do not do so.

We also asked the surveyed companies if they were satisfied with lining life, and with drum life.

Twelve transit companies said they were satisfied with their present lining life, while 19 said they were not. Those who were operated 1,349 buses, as against 5,755 for the dissatisfied companies.

In general, intercity operators are more content with lining life. Eleven companies with 1,151 buses are satisfied with what they're getting, while three companies with 566 buses are dissatisfied.

As far as drum life is concerned, transit showed 16 companies satisfied, and nine dissatisfied. Those who feel that drum life is OK have 2,941 buses, compared to 3,849 for those who want better drum performance.

Intercity operators felt pretty much the same way about drums as they did about lining life. Ten companies with 1,119 buses said they were satisfied with drum life, while four companies with 598 buses were not.

The survey pointed out clearly that bus companies invest a considerable amount of money every year in brake parts.

As a matter of fact, the 41 companies surveyed, operating less than 9,000 buses, spend almost $500,000 on brake parts every year.

This figure doesn't include their investment in shop equipment used for brake maintenance.

This totaled $80,000 for the 27 transit companies, and $40,000 for the 14 intercity companies, for a total investment of $120,000 for shop equipment.

BUS TRANSPORTATION

1955

BUYERS' GUIDE

An authoritative source of "where-to-buy" information on Bus Parts, Materials, Accessories, Shop Equipment and Tools will be found on the following pages.

This Buyers' Guide contains the names of more than 1,600 manufacturers and classifies some 350 products used by bus operators.

[* **Manufacturers whose products are described in the advertising pages of this or previous issues during the past year.**]

McGRAW-HILL PUBLISHING CO., INC. **330 W. 42nd St., New York 36, N. Y.**

VEHICLE, BODY, CHASSIS MANUFACTURERS

Associated Equipment Co., Ltd., Southall, Middlesex, England
*Beck & Co., C. D., Sidney, Ohio
*Berliet, 26 Rue de la Pepiniere, Paris 8, France
*Blue Bird Body Co., Fort Valley, Ga.
Carpenter Body Works, Mitchell, Ind., (Bodies)
*Checker Cab Mfg. Co., Kalamazoo, Mich.
Chevrolet Motor, Div. GMC, Detroit, Mich. (Chassis)
Coachette Co., Dallas 18, Texas
Corbitt Co., Henderson, N. C.
*Crown Body Coach Corp., Los Angeles 21, Cal. (Bodies)
Dodge Brothers Corp., Detroit, Mich. (Chassis)
*Fitzjohn Coach Co., Muskegon, Mich.
*Fixible Co., Loudonville, Ohio
*G.M.C. Truck & Coach Div., G.M.C., Pontiac, Mich.
Hackney Bros., Inc., Wilson, N. C.
Hicks Body Co., Lebanon, Ind. (Bodies)
Intercontinental Mfg. Co., 1819 Broadway, New York, N. Y.
International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. (Chassis)
Leyland Motors, Ltd., Lancashire, England
*Mack Mfg. Corp., Empire State Bldg., New York 1, N. Y.
*Marmon-Herrington Co., Indianapolis 7, Ind.
*Metropolitan-Cammell-Weymann Motor Bodies, Ltd., Westminster, England
National Coach Mfg. Co., Beaver Falls, Pa. (Beaver Coach)
Oneida Products Corp., Canastota, N. Y.
Pacific Car & Foundry Co., Renton, Wash.
*Pullman Standard Car Mfg. Co., 79 E. Adams St., Chicago, Ill.
Queen City Chevrolet Co., Cincinnati, Ohio
*Reo Motors, Inc., Lansing, Mich.
*St. Louis Car Co., St. Louis, Mo.
Shop of Siebert, Inc., Toledo 2, Ohio
*Southern Coach Mfg. Co., Evergreen, Ala.
Superior Coach Corp., Lima, Ohio
*Transit Buses, Inc., Detroit 27, Mich.
*Twin Coach Co., Kent, Ohio
*Utility Truck Distributors, Union City, Ind. (Bodies)
*Ward Body Works, 4201 S. Congress Ave., Austin, Texas (Bodies)
Wayne Works, Richmond, Ind.

ENGINES, MANUFACTURERS of

Air Cooled Motors, Inc., Syracuse, N. Y.
Buda Co., Harvey, Ill.
Chrysler Corp., Industrial Engine Div., Detroit 14, Mich.
*Continental Motors Corp., Muskegon, Mich.
*Cummins Engine Co., Columbus, Ind.
Detroit Diesel Engine Div., General Motors Corp., Detroit 23, Mich.
*Fageol Products Co., Kent, Ohio
*General Motors Truck & Coach Div. General Motors Corp., Pontiac, Mich.
Hall-Scott Motor Car Co., Berkeley, Calif.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis.
Hercules Motors Corp., Canton 2, Ohio
International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.
*LeRoi Co., Milwaukee 4, Wis.
Lycoming Div., Aviation Corp., Williamsport, Pa.
*Mack Mfg., Empire State Bldg., N. Y. C.
*Twin Coach Co., Kent, Ohio
Waukesha Motor Co., Waukesha, Wis.
Wisconsin Motor Corp., Milwaukee, Wis.

AIR CONDITIONING EQUIPMENT (For Buses)

Anemostat Corp. of America, 10 E. 39th St., New York 16, N. Y.
Carrier Corp., Syracuse 1, N. Y.
Frigidaire Div. General Motors Corp., Dayton 1, Ohio
Keco Industries, 2832 Spring Grove, Cincinnati, Ohio
Trane Co., La Crosse, Wis.
*Tropic-Aire Inc., 5201 W. 65 St., Chicago 38, Ill.
York Corp., York, Pa.
*Vapor Heating Corp., Railway Exchange, Chicago 4, Ill.

AXLES, MANUFACTURERS of REAR

*Clark Equipment Co., Buchanan, Mich.
Eaton Mfg. Co., Cleveland 10, Ohio
Shuler Axle Co., Louisville, Ky.
*Spicer Mfg. Div. of Dana Corp., Toledo 1, Ohio
*Timken-Detroit Axle Co., Detroit, Mich.

* This Asterisk . . .

. . . Prefixing the name of any manufacturer listed in the Buyers' Guide indicates more complete descriptions of this manufacturer's products appear in advertising pages of this or previous issues during the past year.

ACCESSORIES, PARTS AND SUPPLIES

ACETYLENE—See Oxygen and Gas, Compressed

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AIR CLEANERS—See Cleaners, Air

AIR-SPRINGS—See Shock-Absorbers

AMPLIFIERS—Mobile

*Midwest Audio Services, Box 245, Park Ridge, Ill.
Z & W Mach. Prods., Inc., 5100 St. Clair Ave., Cleveland 3, Ohio

ANTI-FREEZE

Commercial Solvents Corp., 17 E. 42nd St., New York, N. Y.
*du Pont de Nemours & Co., E. I., Wilmington, Del.

Continued on page 119

Industry In Review

S. R. Sundstrom

J. L. Sheppard

H. P. Brawner

Four-Way Merger Creates New Greyhound Giant

• Eastern Greyhound Lines, the name of the new division combining the operations of four Greyhound properties, was born early last month.

The companies being consolidated are the four eastern carriers, Penn, Central, Capitol and New England. Penn and Central had been consolidated after they became wholly-owned properties of the corporation.

All four were wholly-owned divisions of the corporation and now go to make up the largest operating division of Greyhound, covering most route miles and producing most revenue. Until now Pacific Greyhound held the top spot.

Boss of the new division is S. R. Sundstrom who until now was president of Pennsylvania Greyhound Lines, while J. L. Sheppard, former president of Central becomes executive vice president of Eastern. The third major shift in personnel sent H. Peirce Brawner, president of New England Greyhound, to Cleveland in a new post as vice president in charge of sales for the new division.

The purpose of the merger is to simplify corporate and financial structures and give Greyhound the advantage of better use of its equipment and more effective coordination of schedules.

The Eastern Greyhound Lines division will operate a total of 16,987 route miles, reaching as far west as Chicago and St. Louis and as far north as Montreal. Southern limit of its operation will be Norfolk, while the division will serve major cities such as New York and Boston.

Other personnel changes include the shift of C. L. Crum, former vice president and general manager of Capitol Lines, to regional manager for Eastern at Boston, Mass. Thomas J. Coskran, assistant regional manager for Central, becomes regional manager for Eastern, while his predecessor L. J. Stewart moves on to Great Lakes Greyhound as VP.

Job changes were not restricted to the operations affected by the consolidation, however. They stretched to the Greyhound Corp. itself. John W. Powell, until now vice president and assistant general manager of Great Lakes was appointed director of transportation for the corporation. He will be on the staff of A. N. Brion, vice president in charge of all Greyhound operations.

Following the recent election of William A. Duvall as vice president in charge of equipment and maintenance for the corporation, several changes have been made.

The department now includes: Harry A. Johnson, former manager of maintenance for Overland Greyhound, director of maintenance; Joseph M. Sills, previously assistant to the president, director of equipment; John C. Neph, who held the title of general purchasing agent, director of purchases; Carl D. Sprain, assistant to the vice president; Nils A. Thunstrom, assistant director of equipment; and R. E. Holland, assistant director of maintenance.

Muni Awards Lease Contract to Mack

• San Francisco's Municipal Railway will become the first major transit operator in the nation to lease instead of buy a full fleet of buses. It has awarded a contract to the Mack Motor Truck Company calling for delivery of 440 vehicles.

The city got only one bid on its leasing plan under which a sixth of its fleet will be replaced each year. Mack will deliver 100 buses—the first installment—in December . . . has agreed to deliver 70 additional coaches each July.

Cost to Muni will be 10.12 cents per mile based on 19,800,000 miles, plus four per cent interest and freight charges of $76,642. This brings the rate nearer to 11½ cents per mile, according to Muni. Even so, the bid was below the 13-cent estimate by Muni.

The San Francisco Public Utilities Commission has approved the initial payment—covering the first 100 buses—of $372,900. Total rental, including interest, freight and use tax, comes to $808,014.

Buses play role in . . .

Charter for Salk Vaccine Shots

• Community Traction Co. in Toledo, Ohio handled the largest single charter movement in its history when 12,345 first and second grade school children were transported to a central location for the Salk vaccine anti-polio shots.

Handling that many youngsters could be a nightmare . . . but the entire trip went off without a hitch, as children were picked up from 82 different public, parochial and private schools and taken to the city health center for the shots.

Twelve buses were used in the operation, which was spread over six days during a six-hour period each day. A thirteenth bus, ready as a stand-by, was never needed. The dozen which saw action made 238 trips, with not one of them running late. Children were picked up at their schools, and then returned after their injections. A teacher accompanied each bus load, while health department personnel and CTC inspectors aided with the loading and unloading at the health center building.

Buses Win Another Survey

• Buses carry two and a half times as many shoppers to downtown Buffalo stores as do private automobiles, according to a survey made by an independent research company and sponsored by Niagara Frontier Transit System.

The survey showed that 68 out of every 100 shoppers use buses for their downtown shopping trips, while only 27 use automobiles and about four walk from nearby points.

NFT President Roswell F. Thoma immediately pointed out that since downtown prosperity depends on buses, traffic regulation and control should be geared to the requirements of bus passengers.

Delay Mass Transit Bill

• Action on Pittsburgh's oft-discussed transit bill has been postponed indefinitely by the state legislature, which doesn't seem in any hurry to report it out of committee. The bill would unify Alleghany County transit under a public authority.

Boost Fight Waxes Hotter

• As might be expected, witnesses for the city of Louisville, Ky., where a hot fare fight is waging, have testified that the Louisville Transit Co. would be riding the gravy train if the LTC-proposed five-cent fare hike went into effect.

Refuting this, however, was Delmer Ison, director of the Kentucky Motor Transportation Department's division of rates and services. Ison supported the company's contention that a fare boost was needed . . . that LTC had made only $27,000 for the first quarter of 1955.

The city's witness, Franz E. Ross, Pennsylvania accountant who was formerly with the MTD, forecast greater earnings for LTC because it was his opinion that riding declines would not be as large as LTC and Ison anticipated.

Ison's testimony prompted the company to ask for permission to put a fare hike into effect immediately and the city objected. The MTD will take the proposal under advisement, however, and announce its decision.

Financial Statements Reported

• Here are financial statements from several transit companies received by BT during the past month:

Seattle Transit System reported that from an operating standpoint, March was the best month for more than a year, with an operating profit of $53,676. It exceeded that of last December by approximately a thousand dollars.

Operating revenues were $906,185, compared with $896,043 for the same month in 1954. There was a decline in riders, but it was offset by the institution of zone fares; in addition, operating costs were cut by $50,000 by curtailing service and by cutbacks in shop operations.

The system shows an operating profit of $43,554 for the first quarter of 1955, plus $20,267 additional earnings on money in the replacement fund.

Provincial Transport Co., Montreal, Canada, reports a consolidated net profit of $215,731, or 62 cents a share, for the year ended December 31, 1954. This compares with $455,001 in 1953, or $1.30 a share.

The company attributes part of the drop-off to extremely bad weather . . . looks forward to an improved showing in 1955.

Portland Transit Co., Oregon, derived a net income of $114,852 from operations in the first quarter of 1955, equal to 32 cents a share on common stock after preferred dividends. In the same period of 1954 there was a deficit of $7,955, amounting to nine cents a share.

Total first-quarter revenue was $1,692,301—up $30,118 over the same period last year. It's explained by an increase in average fare from 13.60 cents in the first quarter of 1954 to 15.54 cents this year, plus an increase in freight handled.

Pittsburgh Railways Co. earned $100,602 for the first quarter of 1955, after provision for interest and taxes, compared to a corresponding figure of $50,815 for the first quarter of 1954.

Riding in the first quarter was still depressed—some of it attributable to substantial unemployment in the Pittsburgh area, and by the department store strike, which kept employes and shoppers off transit vehicles by the thousands. The strike, however, was concluded on March 21 after a 68-week stoppage.

The Fare Box

Here are some of the fare increases bus operators have asked for or gotten around the country in order to operate profitably. Not to be considered complete, the list merely lets you know what other operators are doing.

Increases Asked

San Diego Transit System, Cal. • Has asked three-cent fare boost—to 20 cents—in application to PUC. Also seeks elimination of tokens and hike from five to six cents for additional zones. Company would sell weekly passes for $3.85 instead of $3.25, plus higher rates for school passes.

Birmingham Transit Co., Ala. • Made application to State PSC for elimination of 13-cent reduced adult ticket; is asking increase in school ticket to half fare. Basic 15-cent cash fare for adults would not be affected.

Baton Rouge Bus Co., La. • Seeks to double five-cent school fare, but city parish transportation committee has recommended one-cent hike.

Increases Granted

Shenango Valley Transportation Co., Pa. • Authorized to up cash fares from 15 to 20 cents, and four tokens from 55 to 70 cents.

Petersburg-Hopewell Bus Lines, Va. • One-cent per zone increase granted on cash fares, two-cent hike allowed on one zone ticket. Student fare remains at six cents.

Philadelphia Transportation Co., Pa. • Will drop 15-cent tickets and will charge one cent for a second transfer. Cash fare of 18 cents and two tokens for 35 cents will remain unchanged.

San Bernardino Valley Transit Co., Cal. • Has upped fares from five for 50 cents to nine for $1. Basic 15-cent cash fare, zone fare of five cents and school fares unchanged.

Syracuse and Oswego Motor Lines, N.Y. • Has received PSC permission to hike zone fares from five to ten cents. Basic fare of ten cents on one run to remain the same, as will 15-cent initial fare on another line.

Greenville Purchase Okayed

• South Carolina's Public Service Commission has approved the purchase of Duke Power Co.'s Greenville City Lines by City Coach Lines, Inc., of Detroit, Mich., for $240,000. City Coach has also contracted to buy out Duke Power properties in six other cities. Total price of all: $750,000.

Safety Party in Memphis

• More than 3,000 Memphis Street Railway Co. employes and their families turned out to celebrate the transit firm's safest year on record, in what officials called the most successful safety party ever held in that city.

Memphis operators were rewarded with food, amusement rides and music in appreciation for their reducing traffic accidents 22 per cent in 1954, as against a city-wide reduction of only three per cent for the same period.

Cleveland Subway Study

• Engineers to make preliminary plans and studies for Cleveland's downtown loop subway were scheduled to go to work late last month.

The subway was approved by the voters . . . then held up pending approval by the Ohio Supreme Court —approval which came several weeks ago and opened the door for the subway's actual construction.

Engineering firms hired to take part in the project include Praeger & Kavanaugh of New York; DeLeuw, Cather & Co. of Chicago and Richard Hawley Cutting of Cleveland.

Honolulu Has Good Year

• Honolulu Rapid Transit Co. reported a successful year in 1954, with net earnings of $227,272 compared with $202,629 the year before.

Despite the fact that passenger decline was reduced from more than 6,000,000 in 1953 to 1,800,000 in 1954, President Edward M. deHarne said that the prospect of rising costs in 1955 will continue to make economies and diversification necessary.

Present policy is to avoid seeking a fare increase except as a last resort. As one of the alternatives Honolulu Limited, a wholly-owned subsidiary formed last year, is building a modern 24-alley bowling alley on HRT property as a first attempt at diversification.

Pacific 'Hound Plans Terminal

• Pacific Greyhound Lines has announced plans for construction of a $500,000 terminal in San Jose, Cal. Construction is slated to start early next year. The new building will replace a terminal used for more than 30 years.

Bus Driver Honored as Outstanding Professional

Charles O. (Bucky) Boran, a bus driver since 1927 for Alexandria, Barcroft and Washington Transit Co. in Alexandria, Va., was honored by the Washington, D. C. Junior Chamber of Commerce as "one of the four outstanding professional drivers in the metropolitan area of Washington, D. C." He earned it by driving 1,263,000 miles without a chargeable accident. Shown above are G. Keneipp, District director of traffic; Judge George D. Neilson of the District Municipal Court; driver Boran and Francis J. Kane, president of the Washington Board of Trade.

Harriman Vetoes Tax Relief Bills

• New York State bus operators were set down for the sixth time running last month when Governor Averell Harriman vetoed bills that would have meant tax relief.

Passed by both houses of the legislature, but vetoed were . . .

• A measure that meant relief from a two per cent tax on gross earnings.

• Another that would have exempted bus men from an additional one-half of one per cent tax levied by the state.

• A third measure that meant bus operators in New York could use 102-in., 40-ft. buses.

The bills were similar to those passed by the legislature last year and vetoed then by Republican Governor Thomas Dewey. Dewey claimed the money (that the taxes would bring in) was sorely needed in the budget, but he vowed a complete study.

As a result of his promise, the Bedenkapp Committee was born. This study group just recently filed its complete report . . . came to the conclusion that bus men needed tax relief to survive.

Democrat Harriman pulled the same old chestnut out of the fire this year, despite the fact that it was hoary and was originally authored by the GOP. He said the state could ill afford to do without the $2 to $3 million the taxes would bring in.

To top it off, Harriman will have the Commissioner of Commerce conduct another study. Bewildered bus operators could do nothing but promise to aid.

Despite the bills he vetoed, Harriman cannot be accused of completely neglecting bus operators. He signed into law two bills permitting municipalities to grant relief from local taxes if they wish.

Another out for bus firms is to look for other avenues of taxation for the state government. Should they come up with a substitute "fall guy" they might be able to get off the hook.

PTC Strikers Return

• A wildcat strike prompted by necessary layoffs of some office workers hit the Philadelphia Transportation Co. last month and ended a week later. Operations were not affected for the most part.

Some 650 office workers walked off their jobs in protest but returned when the firm pointed out that the work force had to be related directly to the amount of work to be done.

TA Makes Its Top Offer

• The New York City Transit Authority will not go above a 5.3 cents increase for its employes, and even that must be based upon operating economies, Maj.-Gen. Hugh J. Casey, chairman of TA, said in answer to union demands of 17 cents an hour.

Negotiations have failed several times on the figure demanded by Michael J. Quill, president of the Transport Workers Union, CIO, representing 33,000 TA employes.

Donates Fares to Charity

• L. O. Browning, owner of the Tulsa Transit Co., recently donated all the fares collected for an hour on a busy Friday in every one of his buses in the city to a lagging charity drive.

TCL to Stay, Says Spokesman

• Tulsa City Lines has no intention of quitting operations in Tulsa, said Kenneth Totten, representing TCL at recent public hearings on proposed route extensions.

Totten scotched rumors that have been circulated for two years that TCL was not interested in staying in the city and thus was not interested in the kind of service it gave. He said the company, a subsidiary of National City Lines, will do everything possible to provide ample service.

"TCL has an investment of $2,500,000 in its Tulsa property; it employs 230 workers and has 120 buses available," said Totten, and the fact that progress has been made in public relations and that city officials have changed their attitudes toward the line is expected to favor mass transportation in Tulsa.

St. Louis Split Line Mended

• The extra long Broadway streetcar line of the St. Louis Public Service Co. which was split in two when a recent zone fare went into effect is one line again.

Traffic congestion on Broadway proved to be so great that the separation of the line added rather than helped the situation so PS went back to the old operation.

Calendar of Events

A list of activities of interest to the bus industry

June

19-21 Pennsylvania Bus Assn., 34th Annual Meeting, Pocono Manor Inn, Pocono Manor, Pa.

22-24 Public Administration Clearing House annual seminar, PACH Headquarters, Chicago, Ill.

23-25 Michigan Motor Bus Assn. Convention, Hotel Whitcomb, St. Joseph, Michigan

30-3 New York State Motorbus Assn, Annual Summer Meeting, Whiteface Inn, Lake Placid, New York

September

14-16 National Association of Motor Bus Operators, Drake Hotel, Chicago, Ill.

26-29 American Transit Assn. Hotel Statler, Boston, Mass.

28-2 Gray Line Convention, Broadmoor Hotel, Colorado Springs, Colo.

October

24-27 National Association of Railroad and Utilities Commissioners, Annual Convention, Grove Park Inn, Asheville, N. C.

November

2-3 New England Bus Association, 20th Annual Fall Meeting, Hotel Kenmore, Boston, Mass.

Springfield Union Asks Hike

• Despite the fact that the Springfield Street Railway has stated flatly its intention of going out of business on June 30, the union with which its workers are affiliated will press for a 15-cent-an-hour increase in wages.

The liquidation date, which coincides with the expiration date of company's contract, was chosen for just that reason, said a company representative, so that the firm could not be accused of not fulfilling its barbargain with employes.

But union spokesmen feel that Springfield's avowed liquidation is just a threat and have countered with a threat of their own. The union will find out on June 30th if the company is serious.

Meanwhile, the firm will compute the cost of such a raise . . . pass the information along to any prospective purchasers.

Industry Briefs

Excise tax exemption for amounts less than 76 cents are called for in a bill introduced in the House of Representatives. As it stands now a ten per cent excise (15 per cent until last year) must be paid on amounts over 35 cents.

Wisconsin's favorable Governor's Report has been made even more favorable with an amendment that allows ". . . a credit against all state taxable income in the amount of ten per cent of the undepreciated book value of the property."

It means operators could keep their fleets up-to-date . . . could buy new equipment and knock ten per cent of its worth at year's end from their state tax bill.

One of the world's largest producers of diesel trucks, Daimler-Benz of West Germany, will set up an American subsidiary, Daimler-Benz of North America, to sell its buses, trucks and cars here. The firm plans to build a plant . . . is looking for American partners to set up a service organization.

Continued dividends are planned for New York City Omnibus Corp., said its president John E. McCarthy at the annual meeting, at the same time declaring a 50-cent dividend for the first quarter of 1955.

McCarthy and the board of directors optimistically set a 50-cent minimum on future quarterly dividends because they felt the company capable of earning at least that much.

Income for the first three months was about $96,000 higher than last year despite falling ridership.

Greater Winnipeg Transit Commission, pleased with the performance of its Flxible-Twin transit buses equipped with the Leyland diesel engine, has ordered 50 more of the vehicles from Twin Coach of Canada Ltd.

All in all the Commission will spend some $3 million in modernizing.

A five-year program with more than $650 million spent on improvements was envisioned by Col. S. H. Bingham, executive director and general manager of the New York City Transit Authority, at the annual luncheon of the New York Building Congress.

Bingham said that New York's capital program for the next five years would be as it was for 1955—with major emphasis being placed on the rehabilitation and modernization of existing lines and equipment.

Interstate Commerce Commission has given final approval to the sale of Blue Ridge Transportation and White Star Lines to Greyhound. The two were bought from Potomac Electric for $1,842,000.

NARUC Plans Panel on Problems

• Top names in transportation regulation will take direct aim on problems faced by transit and by communities across the nation when the National Association of Railroad and Utilities Commissioners meets at Ashville, N. C., Oct. 24-27.

A five-man panel, all familiar with mounting transit-traffic problems, will discuss those problems affecting the transit operator, the municipality and the public. Members of the panel will include these commissioners: Glen R. Bedenkapp, N. Y.; Robert McLaughlin, District of Columbia; Ray E. Untereiner, Cal., and Paul A. Rasmussen, Minn. Leon Schwartz, chairman of the Pennsylvania PUC, will act as moderator.

All have done extensive research, seeking ways to improve mass movement of people and to break the traffic stranglehold in many city areas.

Audience participation in a question-answer period will be held during the panel session.

Firms, Unions Join Forces

• The usually less-than-cordial relations of New York City bus operators and the unions representing their employes took a turn for the better last month. The city's privately-owned transit industry and unions representing its 10,000 workers joined forces to find a way to halt a continuing drop in passengers.

Meeting with Theodore W. Kheel, industry-union impartial chairman, the group mapped plans for its campaign to stem the recession.

First step would be to try to pinpoint the causes for riding declines . . . to prove to the community how important mass transportation is . . . to find ways and means of increasing ridership in New York. But, Kheel pointed out, cooperation would be needed.

Hats Off to No. 53—It's Buses for BC

Sleek new buses have replaced British Columbia Electric Co.'s trolleys and no one seems sad about it. Vancouver Mayor Fred Hume and BCE president A. E. Grauer are wreathed in smiles as they board for the last ride. Actually, trolleys such as this were brought out of mothballs for a last free rail ride.

ABOUT PEOPLE . . .

A. H. "Hilly" Foster, assistant manager of operations for the Toronto Transit Commission and VP of Gray Coach Lines, has announced his retirement. Hailed for his work with Gray Coach, he will still advise.

Charles Moyse, superintendent of automotive equipment for the Toronto Transit Commission, has retired after nearly 45 years of service. Moyse worked on TTC's first automotive equipment.

Robert G. Gillespie, former assistant to the superintendent of automotive equipment, has been promoted to the superintendent's position. He joined TTC in 1929 while a student of engineering in Toronto.

Norman Leeds, Jr. was elected to the board of directors of Raybestos-Manhattan, Inc. at a recent stockholders' meeting. With the firm for 29 years, Leeds is factory manager of the Raybestos division.

Carl H. Mueller, director of engineering for the Lincoln Engineering Company of St. Louis, has been elected vice-president in charge of engineering. Mueller has been with the company for 20 years.

John E. Renner has been elected vice-president in charge of sales for the Lincoln Engineering Company. He has been associated with the firm for 20 years and previously was general sales manager.

A. C. Holmquist has been elected financial vice-president and treasurer of the Milwaukee and Suburban Transport Corporation. Holmquist was named to the post at the firm's annual meeting held recently.

Clayton S. Steele, formerly assistant manager of the Norfolk Division of the Virginia Transit Company, has taken over the position of transit operations engineer for the city of Philadelphia.

C. L. Crum, former vice president and general manager of Capitol Geryhound Lines, has been named regional manager for the new Eastern Greyhound Lines at Boston, Mass. He joined Capitol in 1931.

John H. Gant was elected by the board of directors of Marmon-Herrington Company to the office of treasurer. He will continue as assistant secretary, a post he has held since 1945. He joined M-H in 1942.

Guy C. Dixon, treasurer of Marmon-Herrington Company since 1945, has been elected vice-president in charge of finance by the board of directors. Dixon has been with the company for 13 years.

Byron Campbell will head the engineering, design and development staff of Allen Electric and Equipment Company in his new position as vice-president-director of engineering, it was announced recently.

Paul M. Stokes has been appointed personnel director of the Greyhound Corporation. Previously, Stokes was in personnel and sales training work with Westinghouse, and acted as a consultant.

George W. Marriott, general manager of Missouri Pacific Bus Lines since 1948, retired June 1. He started his transportation career in 1905 and joined Missouri Pacific in 1907 as a stenographer.

Merton Ephraim has been appointed regional sales manager for Continental American Trailways. He will supervise salesmen in Pittsburgh, Omaha, Kansas City and Springfield, Mo.

Loyd E. Williams has been promoted to manager—distribution for the Cummins Engine Co., Inc. He will be in charge of the firm's 12 regional offices, and will handle domestic distributor activities.

Richard T. Karr has been appointed to the newly created position of general sales manager, equipment sales division for Purolator Products, Inc. He had been assistant to the VP in charge of sales.

Nick Vale will take over as GM Coach representative in eastern Pennsylvania, southern New Jersey and parts of Delaware. He had been with GM's survey department.

Continued on next page

Earl L. Lochen, operating manager of Milwaukee and Suburban Transport Corp. since January, has been elected operating vice-president.

A veteran of 40 years, Lochen will continue to have direct charge of all operating functions, including transportation, schedules, maintenance of equipment and ways and structures.

Thomas Bayne Wilson has been sworn in as deputy under secretary of commerce for transportation. From 1929 to 1933 he served as president of several West Coast bus properties, including Pacific Greyhound Lines.

From 1938 to 1945, Wilson was on the board of directors and was vice-president of All American Bus Lines.

Joseph D. Ryle, assistant to the president of National Transitads, Inc., has been elected president and a director. Other changes included the election of **Livingston Goddard** as chairman of the board of directors.

John K. Dunn has been elected vice-president of sales for the firm, and **Robert S. Eisenhauer,** public relations director for the parent Chesapeake Industries, was named a director of National Transitads.

John W. Alspaugh, one of the organizers of Camel City Coach Lines, which after a series of mergers became Atlantic Greyhound Corp., died recently.

James P. Wakelam has joined the midwest sales force of the Bowers Battery and Spark Plug Co. He was formerly automotive engineer in charge of bus maintenance for the Philadelphia Transportation Co.

Joseph B. Land, managing partner of the Albuquerque Bus Co., died recently at the age of 61. Mr. Land entered the bus business in 1940 when he bought an interest in the Armijo Bus Co.

Earl W. Smith, 57, vice president of Southeastern Greyhound Lines and former president of Dixie Greyhound Lines before its consolidation with Southeastern, died April 26 at Memphis, Tenn.

Mr. Smith started in the bus industry in 1929 with his brother, the late Fred Smith, operating the Smith Motor Coach Co.

Clarence B. Bergren, former manager of the Thor Power Tool Co.'s Cleveland branch, has been named branch manager at Milwaukee by the tool company.

Robert J. Grace, service engineer in the firm's Indiana territory, has been appointed to succeed Bergren in Cleveland.

Daniel L. Feick, founder and president of Brentwood Motor Coach Co., Pittsburgh, died recently.

Donald V. Lowe has been elected to the chairmanship of the Port of New York Authority, succeeding **Howard S. Cullman,** who retired last month. Lowe has been a member of the board of the Authority since 1945 and vice chairman since 1953.

Bayard F. Pope was elected vice chairman.

Col. Richard N. Atwell, retired Army officer, has been appointed superintendent of buses and shops for the New York City Transit Authority.

Former chief of the Army Ordnance Automotive Research Section, Col. Atwell succeeds **Anthony J. Carrano,** who retired. His job will be to modernize bus maintenance, making it more efficient and economical.

BUS AND TROLLEY BUS DELIVERIES

Motor Bus Deliveries	Number of Buses	Manufacturers	Model and Type	Seat
Airlines Transit (Mo.)	29	Flxible	218B1-55-29IC	29
Baltimore & Annapolis R. R. Co. (Md.)	3	GMC	PD-4104	41
Baltimore Transit Co. (Md.)	6	GMC	TDH-5105	51
Bauer, Albert F., Inc. (N. J.)	1	GMC	TDH-3714	37
Bieber, Carl R. (Pa.)	1	GMC	PD-4104	41
Blue & Grey Corp. (N.J.)	2	GMC	TDH-4512	45
Blue & White Lines, Inc. (Pa.)	1	Flxible	228JT1-55-37IC	37
Capitol Bus Co. (Pa.)	7	GMC	PD-4104	41
Carolina Coach Co. (N. C.)	30	GMC	PD-4104	41
Charlotte City Coach Lines, Inc. (N. C.)	8	GMC	TDH-4512	45
Chicago Transit Authority (Ill.)	2	Flxible	FT-2P-40-55-52	52
Clifton Buses Inc. (N. J.)	2	GMC	TDM-5108	51
Crown Coach Co. (Mo.)	2	GMC	PD-4104	41
Glenridge Coach Co., Inc. (N. Y.)	1	GMC	PD-4104	41
Grand Rapids City Coach Lines, Inc. (Mich.)	15	GMC	TDH-5105	51
Gulf Transport Co. (Ala.)	2	GMC	PD-4104	41
Hudson Bus Transportation Co., Inc. (N. J.)	2	GMC	TDH-5106	51
Hudson Transit Lines, Inc. (N. J.)	2	GMC	PD-4104	41
Intermountain Transportation Co. (Mont.)	2	GMC	PD-4104	41
Kerrville Bus Co. (Tex.)	3	GMC	PD-4104	41
Knoxville Transit Lines (Tenn.)	10	GMC	TDH-5105	51
Manhattan Coach Lines, Inc. (N. J.)	2	GMC	PD-4104	41
Frank Marts Coach Co. (Pa.)	4	GMC	PD-4104	41
McKeesport Transit Co. (Pa.)	1	Fitzjohn	Cityliner	37
Merts White Way Tours, (Pa.)	1	GMC	PD-4104	41
Minneapolis Street Ry. Co. (Minn.)	100	GMC	TDH-5105	51
Missouri Transit Co. (Mo.)	1	GMC	PD-4104	41
New Mexico Transportation Co., Inc. (N. Mex.)	2	GMC	PD-4104	41
Niagara Scenic Bus Lines, Inc. (N. Y.)	2	Flxible	218B1-55-33IC	33
Northland Greyhound Lines, Inc. (Minn.)	3	GMC	PD-4501	45
Northwest Greyhound Lines (Wash.)	3	GMC	PD-4501	45
Overland Greyhound Lines (Neb.)	2	GMC	PD-4501	45
Pacific Greyhound Lines (Calif.)	32	GMC	PD-4501	45
Painter Bus Line Tex.)	1	Beck	Airglide	37
Peerless Stages, Inc. (Calif.)	3	GMC	TDM-4512	45
Philadelphia Transportation Co. (Pa.)	300	GMC	TDH-5106	51
Pickett Service Co. (Va.)	1	Flxible	218B1-55-29IC	29
Queen City Coach Co. (N. C.)	1	Beck	DECK & HALF	39
	1	Beck	DECK & HALF	41
Queen City Trailways (N. C.)	1	Fitzjohn	Road Runner	37
R & H Company, The (Conn.)	1	GMC	PD-4104	41
Randall, Herbert T. (Ohio)	1	GMC	PD-4104	41
Southeastern Greyhound Lines (Ky.)	1	GMC	PD-4501	45
Texas, New Mexico & Oklahoma Coaches, Inc. (Tex.)	8	GMC	PD-4104	41
Vermont Transit Co., Inc. (Vt.)	3	GMC	PD-4104	41
Western Kentucky Stages (Ky.)	1	Flxible	218F1-55-29IC	29
Winter Garden Bus Line (Tex.)	1	Beck	B-29	29
Miscellaneous Deliveries				
Airlines Transit (Mo.)	1	Flxible	218B6-55-33SS	33
American SS Tour Co., Inc. (La.)	1	Flxible	218B6-55-33SSAC	33
Bohl Tours, Inc. (N. Y.)	1	GMC	PD-4104	41
Colburn Mtr. Tours, Inc. (Colo.)	1	Flxible	146F6-55-21SS	21
Transit Sales & Service (Conn.)	1	Fitzjohn	Cityliner	31
U. S. Naval Station (Va.)	1	GMC	PD-4104	41
Foreign Deliveries				
Cooperativa de Omnibus Aliados, (Cuba)	5	Beck	DECK & HALF	41
Distribuidora de Omnibus (Mexico)	11	Fitzjohn	Duraliner	32
General Motors Corp. Foreign Distributors Div. (N. Y.)	1	GMC	PD-4104	41
Velarde, J. G. Lopez (Mexico)	1	Flxible	218JBS1-53-29IC	29

Total Deliveries reported in this issue . . 632

NOTE: This list is based on monthly reports from manufacturers. Not all manufacturers report regularly, consequently this list is not to be considered complete.

Make All Your Low Pressure Hose Lines from This *NEW* Aeroquip Kit

SPEED REPLACEMENT! CUT COSTS! REDUCE INVENTORY!

DURABLE ALL-STEEL BOX

JUST PUSH Aeroquip 1525 Hose on the **SOCKETLESS** Fitting . . . It Stays On Even at Pressures as High as 250 p.s.i.
PATENT APPLIED FOR

Back of fitting tray can be raised for convenient use

Kit 5144 contains 93 fittings and adapters in 20 sizes and types

Compartment of Kit 5144 contains 24 ft. of ¼" hose, and 24 ft. of ⅜" hose

Pull out hose, measure it, and cut with knife

Many users have requested a permanent-type container for Aeroquip *SOCKETLESS* fittings and hose. So this durable all-steel Kit 5144 is now available. It contains an inventory of hose, fittings, and adapters in types and sizes that will meet practically all low pressure applications.

With remarkable new Aeroquip *SOCKETLESS* fittings and hose, fuel, oil, water, and air lines can be made and installed *extra fast* on all kinds of industrial and mobile equipment. Field replacement is simplified because Kit 5144 is compact (12½" x 12½" x 6½" when closed) and it will stand up in field service.

Aeroquip *SOCKETLESS* fittings and hose are saving time and money for users in every industry. Get the complete story from your Aeroquip distributor, listed in your Yellow Page Directory, or write us.

Also Available: 15-Cell Kit No. 5143 with 24 feet of ¼" hose and 71 fittings and adapters in same box.

Aeroquip
REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U.S.A. AND ABROAD • AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

Adlake Aluminum Sash is installed on this new CTA bus!

The Chicago Transit Authority is assured the lowest possible window sash maintenance costs on its new Flxible buses, because they are equipped with Adlake aluminum sash. Look at the advantages it gives:

Adlake aluminum sash can't rust or corrode.

The perfect weather seal of deep-pile weatherstripping will keep out weather for the life of the coach.

Adlake aluminum sash can't warp out of shape—never sticks or rattles.

For more information about Adlake Aluminum Sash, write The Adams & Westlake Company, 1154 N. Michigan St., Elkhart, Indiana. No obligation, of course.

the Adams & Westlake company

Established 1857 • ELKHART, INDIANA • New York • Chicago

Adlake 98th year of serving the transportation and building industries

Repair Bills cut 1/3

with Phillips 66 Heavy Duty Motor Oil

Lee Stahl supervises maintenance for Chicago School Transit, Inc., operating 29 school buses and nine station wagons to carry almost 1,000 children a day from individual homes to public and private schools. With his wife and Joe Cheeck, he also owns and operates the company.

Says Mr. Stahl: "Our engines take a year 'round beating. Besides school hauls, there are Saturday football games, Sunday School runs, and during vacation, summer camps and play groups. Stopping at every child's home, a bus makes up to six stops in one block . . . does this for 100 miles a day. Put these stops together with low speeds for narrow streets and you get a terrific sludge problem. We had ring and valve trouble. Motors were wearing out much too soon."

Back in 1949, Chicago School Transit, Inc. changed to Phillips *66* Heavy Duty Motor Oil. From the first, it solved their problems.

"Our records show we've cut repair bills by one-third," says Lee Stahl. "Now, one night-time mechanic easily handles all our maintenance. Engines are cleaner . . . go longer before overhaul. One Ford 60-passenger bus has needed nothing more than a tune-up after nearly four years of operation on your oil."

Today, Chicago School Transit uses Phillips *66* Gasoline, Gear Oils and Greases, as well as Heavy Duty Motor Oil. They depend on these products for good service and for keeping repair bills down.

Good service with less maintenance always means more profit. And no matter what *your* operation, there's a Phillips *66* Heavy Duty Motor Oil that's suited for *your* fleet.

● Test Phillips 66 Heavy Duty Motor Oils against the oil you are now using. A Phillips 66 Lubrication Engineer will be glad to help you set up a test. Write to: Sales Department, Phillips Petroleum Company, Bartlesville, Oklahoma.

It's Performance That Counts!

Phillips 66

PHILLIPS 66 HEAVY DUTY MOTOR OILS

FIRST IN ORIGINAL EQUIPMENT SERVICE
FIRST FOR REPLACEMENT, TOO!

It's Always Best to RECONDITION WITH THE "ENGINEER APPROVED" PISTON
ZOLLNER HEAVY DUTY
Used and Recommended by over 70% of all Truck and Bus Manufacturers

Experience counts — and the experience records of fleet owners, everywhere, prove "top engine performance and lower operating cost with Zollner Pistons." *Here's why!* Zollner Pistons are specifically tailored to individual engine requirements. Engine manufacturers work hand-in-hand with Zollner engineers in the development of each piston specification. For replacement as well as original equipment, Zollner is the "engineer approved" piston, expertly designed and precision-made. You are always safe and sure when you specify Zollner for every piston job.

ZOLLNER

HEAVY DUTY PISTONS

ZOLLNER MACHINE WORKS • FORT WAYNE, INDIANA

This Fuel-Lubricant Team can cut your Diesel Maintenance Costs

GULF DIESELECT FUEL

GULF DIESELUBE MOTOR OIL H.D.

The best fuel choice you can make for your Diesel engines! Here are some of its outstanding advantages:

1. 100% straight run distillate—contains no cracked material
2. Does not form harmful deposits in tanks, filters, and injectors
3. Clean burning
4. High volatility
5. High Cetane Number
6. Low end point
7. Minimum smoke

Because it is so clean burning, Gulf Dieselect Fuel helps prevent fouling of oil control rings and reduces ring sticking. And because of its high volatility, it vaporizes quickly and burns so evenly, so completely you can be sure of cleaner valves.

The ideal lubricating oil for Diesel engines in trucks and buses. Combines quality with economy —both in cost and service.

Gulf Dieselube Motor Oil H.D. is a heavy-duty type oil that not only provides effective lubrication but has the right level of detergency to keep engines clean. It prevents sticking of piston rings, plugging of oil rings, and clogging of oil screens.

* * *

Use Gulf Dieselect Fuel and Gulf Dieselube Motor Oil H.D. in your Diesels for more hauls, fewer overhauls, greater fleet availability, and lower maintenance costs. Give us a chance to prove it by contacting your nearest Gulf office. Or write on your letterhead to Gulf Oil Corporation, 1822 Gulf Building, Pittsburgh 30, Pa.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

EQUIPPED WITH

"Our buses run 50% longer

reports **R. C. CHEATHAM**

Supt. of Automotive Equipment
Missouri Pacific Transportation Co.

"During recent years, motor coach maintenance has become a tougher problem. With our cross-country assignments and pool service, it's impossible to put buses into the garage as frequently as before.

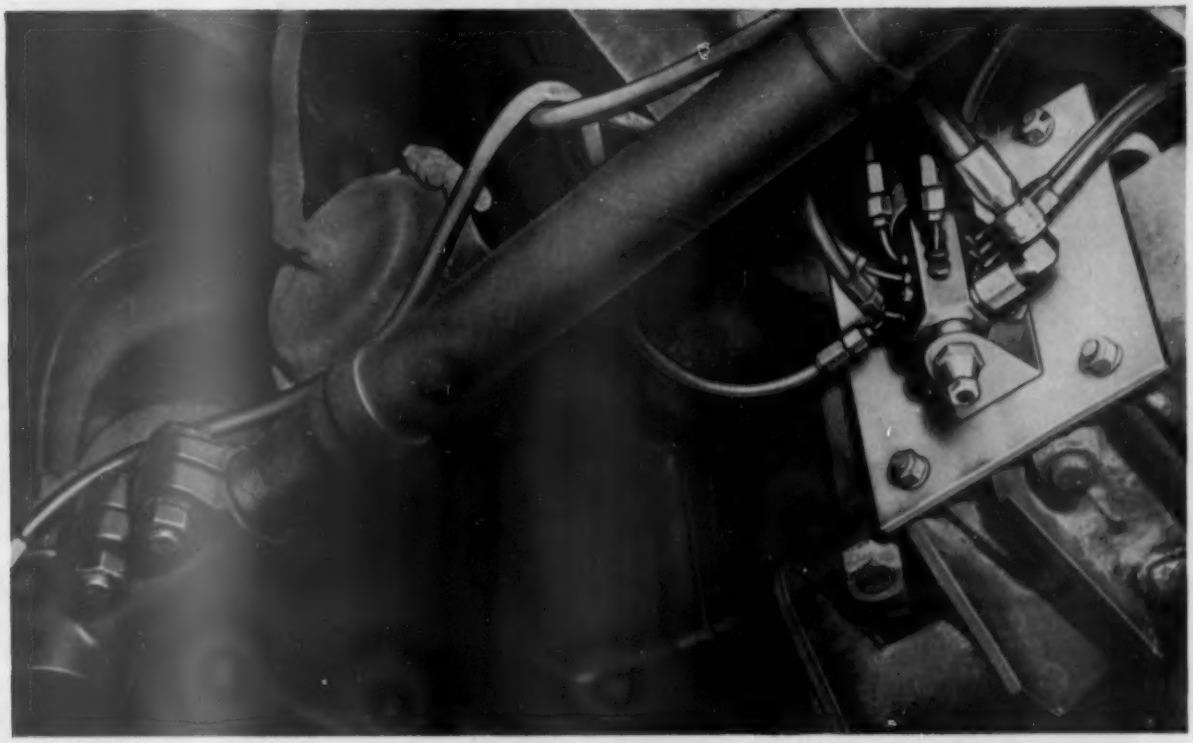
"As a result we began to get complaints about 'hard steering' from the drivers ... particularly during bad weather. To solve this problem we installed our first Lincoln Multi-Luber Power Lubrication System about a year and a half ago.

"This unit worked out so well that we are now installing Multi-Luber Systems on all of our cross-country and pool service buses. Along with eliminating our steering lubrication problems, we have found that Lincoln Power Lubrication has increased our motor coach service more than 50% between front-end overhauls."

(signed) **R. C. Cheatham**

Lincoln

THE MOST TRUSTWORTHY NAME IN LUBRICATING EQUIPMENT



*Lincoln Multi-Luber** POWER LUBRICATION

between front-end overhauls"

Here's the Proven Answer to More Efficient Fleet Operation... More Profit Per Ton Mile.

Insure your Truck-Trailers with Lincoln Multi-Luber Power Lubrication. Complete Systems are available in easy-to-order kits. Can be installed in four to six hours by your maintenance mechanic. Every bearing served by the System is completely and thoroughly lubricated, automatically, each time driver actuates the air brake.

For Full Information...

mail this coupon today!

*Trade Name Registered Patent Pending

LINCOLN ENGINEERING COMPANY

5765 Natural Bridge Avenue • St. Louis 20, Missouri

Lincoln Multi-Luber lubricant reservoir is conveniently installed in the corner of one of the bus baggage compartments.

LINCOLN ENGINEERING COMPANY
5765 Natural Bridge Ave., St. Louis 20, Missouri

Please send me information on Multi-Luber Power Lubrication Systems for Truck Fleet installation.

Name .....

Company .....

Address .....

City ..... Zone ..... State .....

Maintenance Records got you going Round in Circles?

Socony Mobil's new P.M. System cuts paper work— helps keep your units humming!

Simple . . . accurate . . . easy-to-follow — that's Socony Mobil's new Preventive Maintenance System! It cuts paper work to the bone... practically eliminates breakdowns due to improper lubrication maintenance... helps reduce maintenance costs.

You work with only three things— work sheet, record folder, control blackboard. We supply record folders and work sheets...show you how to use them, help set up the entire system.

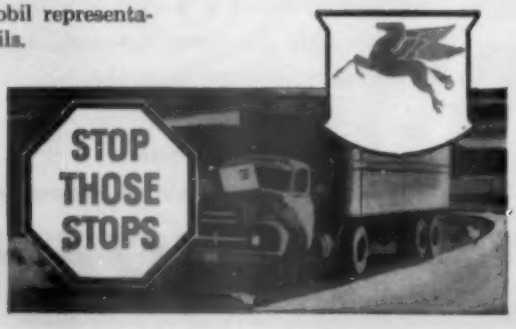
We also analyze your fleet conditions, help you set up lubrication schedules and inspection periods, provide skilled lubrication engineers when necessary, report on benefits achieved.

* * *

Call your Socony Mobil representative for complete details.

CORRECT LUBRICATION FOR FLEET OPERATORS

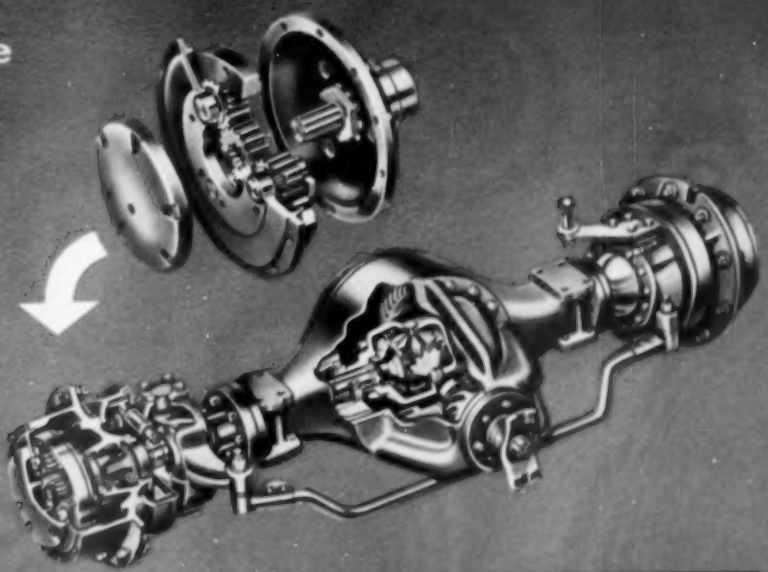
THE FLYING RED HORSE COMPANIES: SOCONY MOBIL OIL CO., INC.
MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.



Takes roughest punishment—

CLARK
Planetary Wheel Axle

Here is good engineering:
a double-reduction axle with
secondary reduction as near point
of tractive effort as possible—*in the driving wheel hub* . . . Axle shaft wind-up
and torque load on all power-train
gears are greatly reduced . . . This axle
is also available as a steering-drive axle.
Steering linkage is rugged, dependable . . .
It's another conspicuous proof that
it's good business to do business with Clark



CLARK® EQUIPMENT

CLARK EQUIPMENT COMPANY • BUCHANAN • Battle Creek, Jackson and Benton Harbor, Michigan

Ross Carrier takes tote boxes of castings to heat treat

How The Shoemaker's Children Got Shoes, or How we followed our own advice AND SAVED $6000 A YEAR!

We recently put a Clark-Ross Carrier to work at our own Axle and Housing Division (Buchanan, Michigan) and saved ourselves $6000 a year. Here's the background:

Our Buchanan plant is an integrated manufacturing operation, but it's spread out over a large area. Long ago we established a central transportation area to integrate the flow of materials to the outlying departments—foundry, shaft, wheel, heat treat, etc. All parts and assemblies are put in tote boxes or palletized for storage in the central area until they are needed in manufacturing or shipping. Previously all the materials were shuttled around to the various departments on a trailer-train. A tractor and driver, a flagman and 28 trailers were required for the job. It was slow, costly in terms of manpower and trailer maintenance, and often caused damage to the loads.

Then we put the Series 70 Carrier (10,000 lbs. capacity) to work. It eliminated the whole trailer-train, which had cost us $2800 a year in maintenance. It eliminated the need for a brakeman—the Carrier is strictly *a one-man operation*. Its big pneumatic tires cushion the load, have eliminated virtually all damage to in-transit materials. At 25 mph, it runs rings around the old system, handles some 3,333,000 lbs. of material per 20-day work month.

Why not look up the name of your local Clark dealer in the Yellow Pages and ask him about the unique advantages of a carrier-handling system: one-man operated, self-loading (3 seconds), capacities up to 50,000 lbs., travel speeds to 56 mph. Speaking from personal experience, we recommend the Clark-Ross Carrier highly!

The Carrier replaced these and other trailers

CLARK EQUIPMENT

ROSS CARRIER LINE
Industrial Truck Division
CLARK EQUIPMENT COMPANY
Benton Harbor, Michigan

ANOTHER CHAMPION CASE HISTORY:

COMPANY — MOTORENT, INC., NASHVILLE, TENN.

CARS — FORD, CHEVROLET, PLYMOUTH, OLDSMOBILE, CADILLAC

TRUCKS — CHEVROLET, FORD, DODGE, GMC, WHITE, INTERNATIONAL

SPARK PLUGS—CHAMPIONS!

W. R. Coop, Supt. of Equipment
Motorent, Inc., Nashville, Tenn.

WHEN PROFITS DEPEND ON PERFORMANCE...

The rental business has terrific maintenance problems. The equipment is subject to hard, continual usage, and yet each vehicle must be in first-class operating condition for the next driver. To keep costs down and operating time up, veterans like Motorent's W. R. Coop buy only the best—and that includes Champion Spark Plugs.

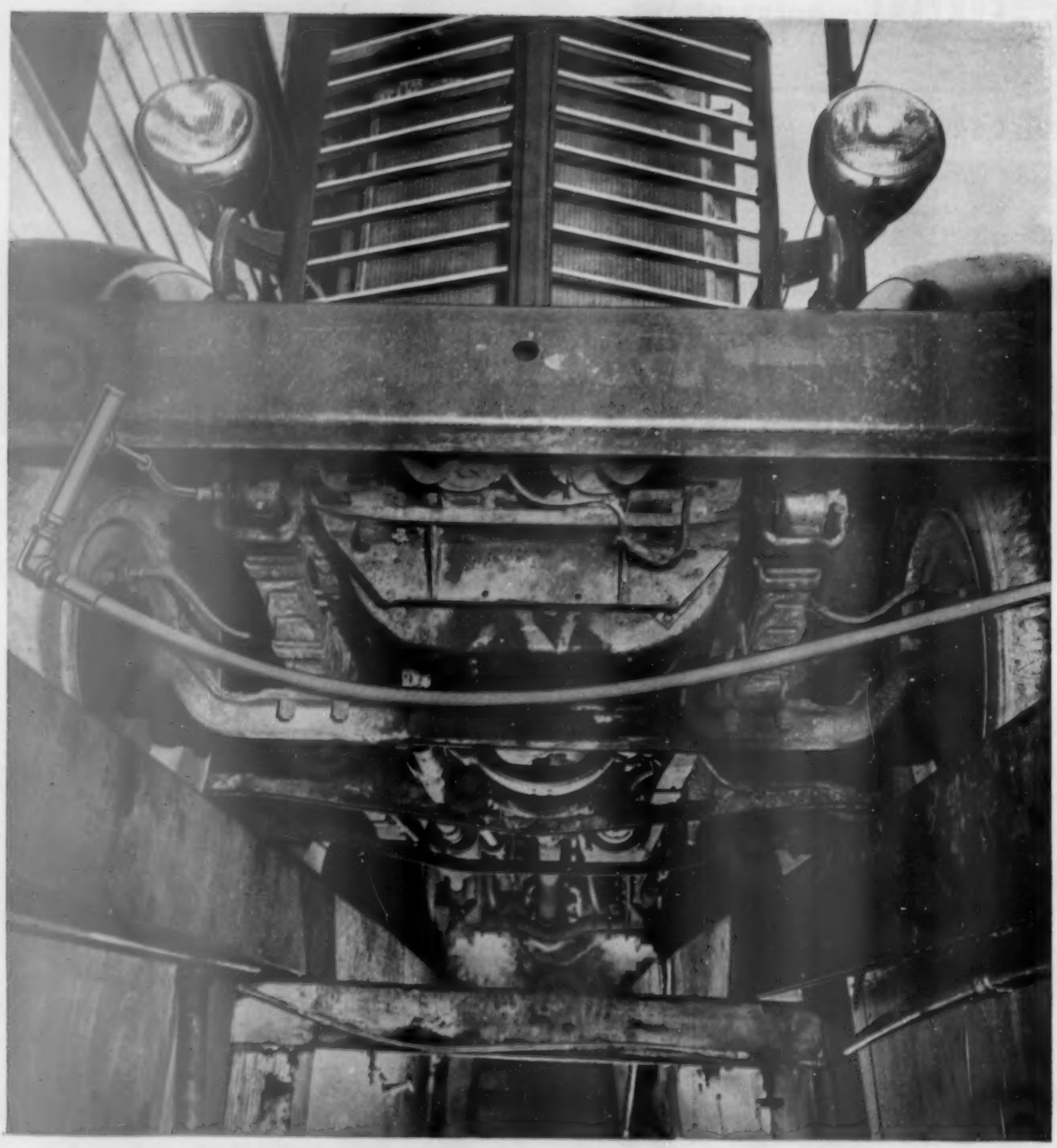
Motorent's trucks and passenger cars run up a yearly mileage in excess of five million miles with 10,000 drivers. Mr. Coop says: "Through years of experience we find Champion Spark Plugs meet every requirement and are truly dependable."

Most fleet maintenance executives agree that a vehicle equipped with full-firing 5-RIB Champions is a better, more profitable piece of equipment.

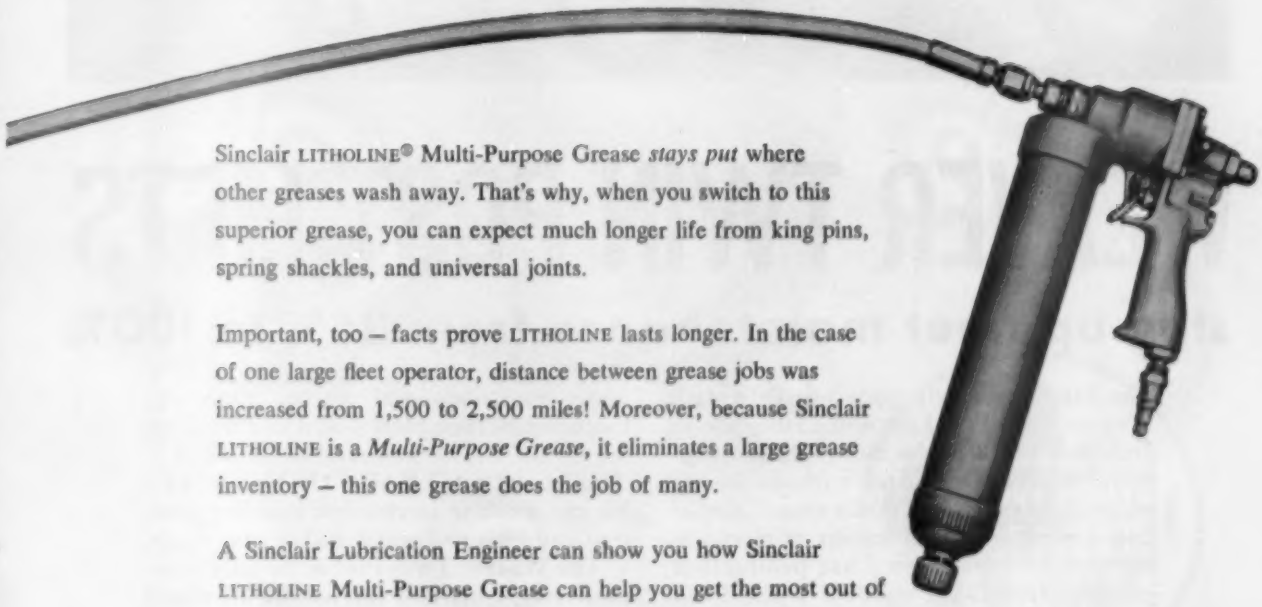
CHAMPION

SPARK PLUGS PAY OFF!

CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO



Won't Wash Away!



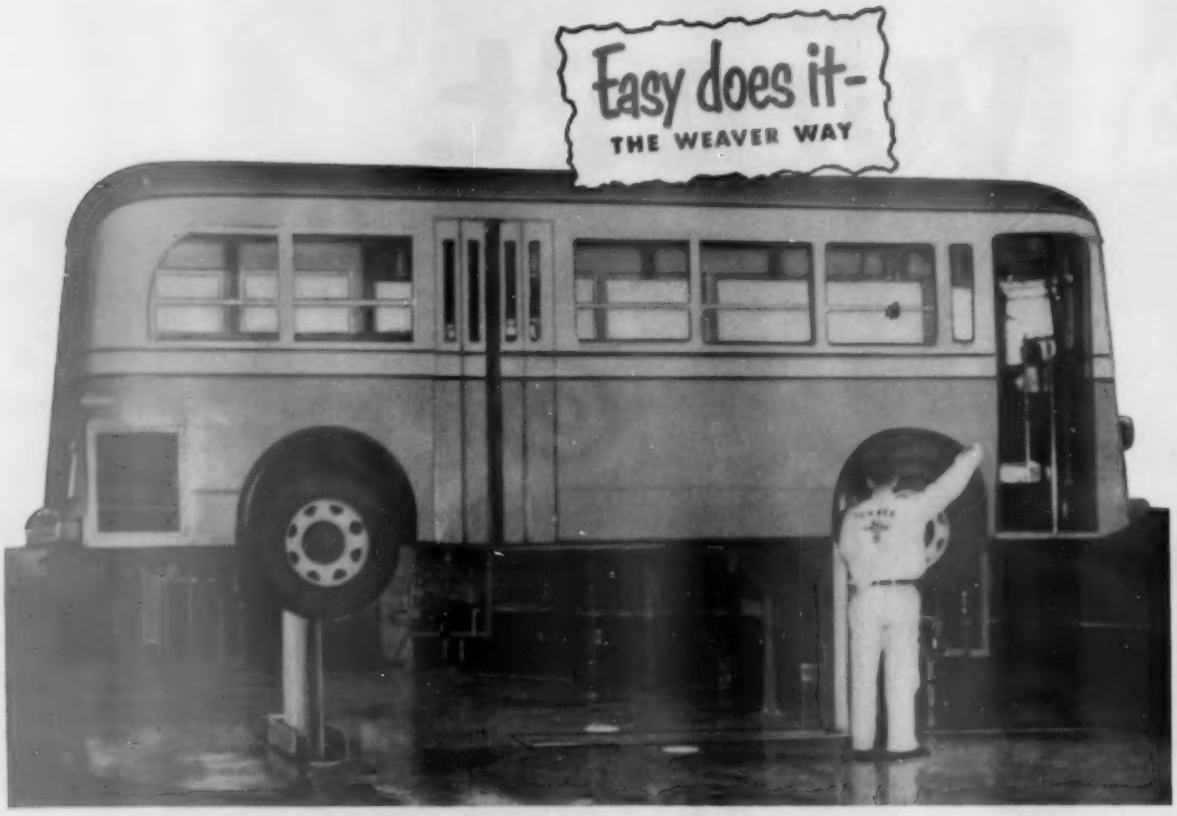
Sinclair LITHOLINE® Multi-Purpose Grease *stays put* where other greases wash away. That's why, when you switch to this superior grease, you can expect much longer life from king pins, spring shackles, and universal joints.

Important, too – facts prove LITHOLINE lasts longer. In the case of one large fleet operator, distance between grease jobs was increased from 1,500 to 2,500 miles! Moreover, because Sinclair LITHOLINE is a *Multi-Purpose Grease*, it eliminates a large grease inventory – this one grease does the job of many.

A Sinclair Lubrication Engineer can show you how Sinclair LITHOLINE Multi-Purpose Grease can help you get the most out of your equipment. Phone your local Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

SINCLAIR LITHOLINE

Multi-Purpose Grease



WEAVER TWIN POST LIFTS

step up fleet maintenance from 25% to 100%

The faster working pace possible with Weaver Twin Post Lifts will enable you to give your bus fleet the thorough, frequent maintenance it requires without losing revenue on excessive "down time." Actual time studies on a wide variety of mechanical service jobs, show that production increases from 25% to 100% when Twin Post Lifts are used instead of previous methods.

A Twin Post will safely, and quickly lift everything from small city buses to large transcontinental coaches. Once up, mechanic has complete visual and working access to every under-chassis point — THERE ARE NO RAILS IN THE WAY! He can work in convenient standing position...roll his tool stand within easy reach.

The Weaver Twin Post is the only automotive type lift that can handle all wheel base lengths without loss of lifting capacity. Available air-oil or electrically operated. Consult your Weaver Jobber today or write us for Bulletin BT-457.

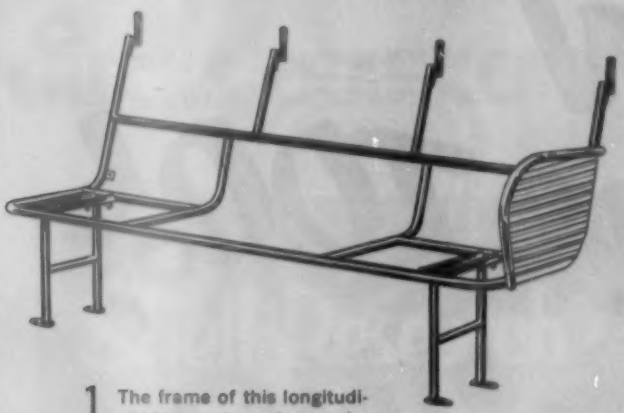
WEAVER

WEAVER MANUFACTURING CO., SPRINGFIELD, ILL., U.S.A.

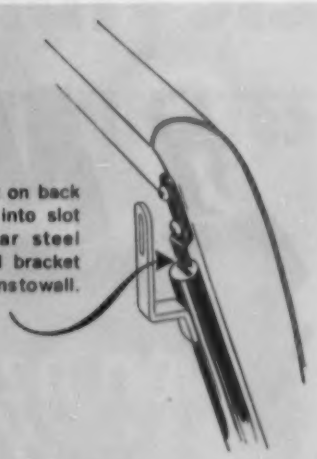
SERVICE SHOP EQUIPMENT

Complete Weaver line includes: Twin Post Lifts . . . Single Post Frame Type Lifts . . . Unit Lifts . . . Bumper Lift . . . Car Washers . . . Wheel Alignment Equipment . . . Headlight Testers . . . Brake Testers . . . Wheel Balancing Equipment . . . Jacks . . . Wheel Dollys . . . Air Compressors.

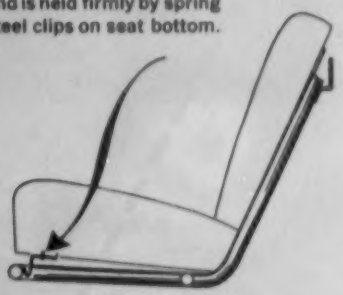
Heywood Develops New Seat Attachment ...Saving Hours of Maintenance Time



1 The frame of this longitudinal bus seat need never be removed for seat repairs.



2 Offset bracket on back drops simply into slot in the tubular steel frame. Slotted bracket on frame fastens to wall.



3 Seat slides easily in place and is held firmly by spring steel clips on seat bottom.

When one of the country's leading bus manufacturers wanted a timesaving device to facilitate the removal of seats and backs on longitudinal seats, Heywood engineers originated the method of attachment shown here. Simple, easy . . . yet this system of seat and back attachment slashes labor costs on maintenance jobs.

HEYWOOD-WAKEFIELD
EST. 1826

Heywood-Wakefield is famous for comfortable, serviceable transportation seating. Our engineering department is anxious to help you solve your own special seating problems.

Transportation Seating Division, Gardner, Massachusetts • Orillia, Ontario, Canada • In Canada: Railway & Power Engineering Corporation, Ltd.

FLEET OWNERS
A NEW PM TOOL
VEHICLE NO.
MAKE
OIL MILES
OIL
TOTAL MILES
*Trademark

ADC* Oilprint Analysis

CHECKS CRANKCASE OIL IN MINUTES

Shell Research gives you new oil-change yardstick—

Now—operators can test crankcase oil in the short time allotted for refueling and crankcase oil checks. The Shell ADC Oilprint Analysis gives a practical and accurate oil evaluation in minutes.

ADC Oilprint Analysis means big savings when used in your preventive maintenance program . . . gives valuable information on engine and oil conditions. It answers the question "When do I change my oil?" thus eliminating the draining of usable oil and the risk of using oils loaded with contaminants.

See for yourself how the new Shell ADC Oilprint Analysis can save you real money in preventive maintenance. Let us demonstrate how you can use this new service for your fleet.

SAVES... Time, Money, Engines, Oil

*Trademark

SHELL OIL COMPANY,

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
100 BUSH STREET, SAN FRANCISCO 6, CALIFORNIA

SHELL

WHY TDA = MORE DEPENDABLE,

merciless testing in world-famous ground insures longer life!

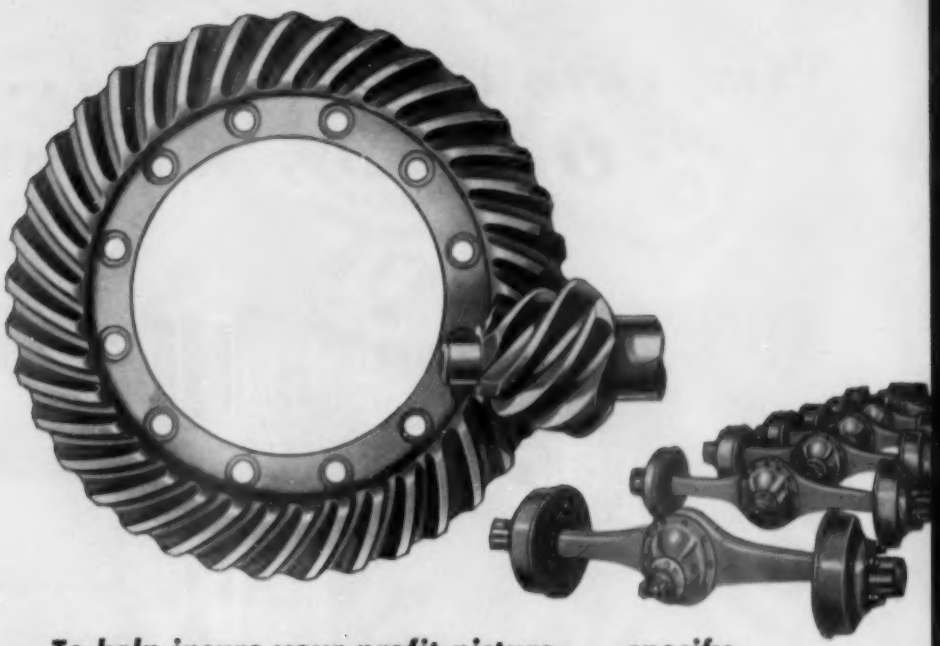
Every shock . . . every strain of a million payload miles is given to stock axles to assure more profitable operation . . . to improve future designs.

This terrific pounding that we give TDA axles in testing has helped us design a bus axle that will take more beating and give more service than any other made.

We condensed a multi-thousand acre proving ground into one room. In it, our engineers apply 50 years of experience in building axles for buses, trucks and trailers. Here bus axles are subjected *indoors* to conditions far worse than any they will meet *outdoors*. Axle performance is measured and analyzed under rigid scientific control.

The results of this painstaking research are new economies and profits for you. You enjoy longer axle life, less maintenance, repairs, and down-time; lower operating costs; fatter returns on your investment. Sound reasons like these explain why Timken-Detroit axles are the choice of so many leading manufacturers and operators.

Meet our "Test Driver". His controls are graphs, gauges and electronic devices. These scientific instruments tell him exactly how TDA axles and gears react to the beatings they take and how they will stand up in actual use.



To help insure your profit picture . . . specify

TIMKEN-DETROIT AXLES WITH HYPOID GEARING

Hypoid gearing for bus axles was pioneered by Timken-Detroit. Proved in billions of ton-miles of actual operation. Designed to make available the slower gear ratios necessary for modern engines without loss of strength. Pinion is bigger, stronger . . . bearings are larger . . . more teeth in contact reducing loading per unit of contact area. Torque transmitting capacity increased to step up performance and rugged power.

You get TDA brakes, too!

Every Timken-Detroit bus axle is equipped with Timken-Detroit brakes. So, when you specify "Timken-Detroit" on your new rubber-tire equipment you *know* you're getting the low-cost operating combination that's "The Accepted Standard" of the industry. Make sure every new transit vehicle you buy is Timken-Detroit axle-equipped!

LOWER COST SERVICE

Timken-Detroit indoor proving

TIMKEN *Detroit* AXLES

TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN

The Accepted T D A Standard
TRADE MARK REGISTERED

All leading manufacturers and operators specify Timken-Detroit safety-tested quality built axles and brakes

Increase axle life with
GENUINE TDA EQUIPMENT PARTS

Take no chances with ordinary replacement parts. For sure, dependable factory-type jobs, specify genuine Timken-Detroit axle parts kits—identical to your axles' original equipment.

Each kit is complete — gives you everything you need in one handy package. Gaskets and shim parts, brake liners, steering knuckles, differential gears — for every size of brake and axle. Order by number from your dealer. Cut labor and adjustment costs. Get trucks back on the road quicker.

"Improved Operation... Practically No Maintenance"

VICKERS HYDRAULIC POWER STEERING
at Jacksonville Coach Company

"We are very much pleased with the Vickers Hydraulic Power Steering which we have on our Series 200 White Diesel Buses," writes J. M. Moore, Vice President and General Manager, Jacksonville Coach Company. "As of March 1, 1955, these 20 buses had a total of 2,621,175 miles with only two repairs to the Vickers Steering Boosters.

"The better maneuverability resulting from this power steering helps maintain schedules as the buses get through city traffic much easier . . . it also often helps avoid accidents. The reduced driver fatigue is reflected in improved safety records. Also, the driver has no fear of loss of control resulting from a front tire blowout. Power steering is a refinement we propose to incorporate on all future equipment."

For all the facts about Vickers Hydraulic Power Steering, ask for Bulletin M-5106.

VICKERS Incorporated

DIVISION OF THE SPERRY CORPORATION

1403 OAKMAN BLVD. • DETROIT 32, MICH.

Application Engineering Offices: ATLANTA • CHICAGO AREA (Brookfield) CINCINNATI • CLEVELAND • DETROIT • HOUSTON • LOS ANGELES AREA (El Segundo) • MINNEAPOLIS • NEW YORK AREA (Summit, N. J.) PHILADELPHIA AREA (Media) • PITTSBURGH AREA (Mt. Lebanon) ROCHESTER • ROCKFORD • SAN FRANCISCO AREA (Berkeley) SEATTLE • ST. LOUIS • TULSA • WASHINGTON • WORCESTER

7171

Vickers Hydraulic Power Steering Booster does the actual work of steering. With the touch of only a finger the driver can steer the heaviest vehicle on or off the road. All road shock is absorbed by Booster and transmitted to the vehicle frame . . . there can be no kick-back at the steering wheel. Fatigue is reduced and driver efficiency increased.

VICKERS hydraulic
POWER STEERING
is Effortless
Positive and Shockless

In a sweat about brake lining?

Brake lining claims coming at you hot and heavy? Got you confused? In a sweat? There's no need to be. Here's one sure thing that makes sense in any man's language . . .

Today, Bendix-Eclipse Brake Linings and heavy-duty frictional materials are used on more new vehicles than any other make! The choice by far of America's leading car and truck manufacturers. And since the earliest days of the automobile, the name "Bendix" has always been identified and associated with every major braking improvement and advancement.

What better assurance could you have that Bendix-Eclipse* Brake Blocks and Linings are best for you. Order your stock now from your local Bendix-Eclipse jobber.

*TRADE MARK

On more new vehicles than any other make

Bendix-Eclipse Brake Blocks and Linings

MARSHALL-ECLIPSE DIVISION OF Bendix AVIATION CORPORATION TROY, NEW YORK

HOW

HARMAN

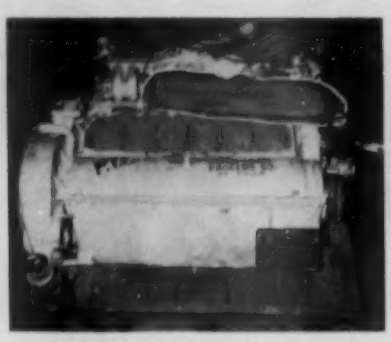
CHAIN-LOCK

Actually Repaired Cracked Motor Blocks

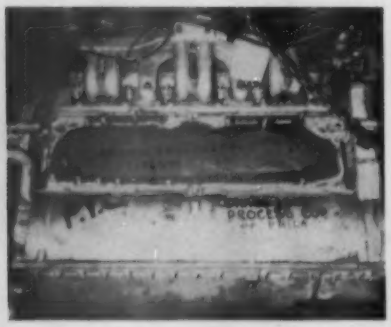
PROBLEM

Fageol Twin Coach cracked motor block. Had previously been unsuccessfully repaired by arc welding. How CHAIN-LOCK successfully did the job.

Removed entire affected area.



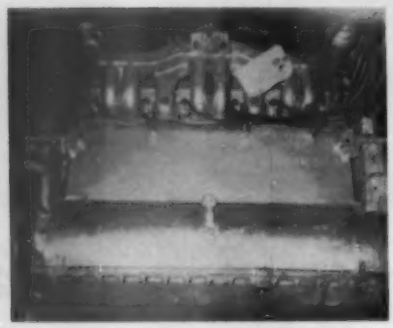
Made new section of cast iron to fit block in order to be certain of strongest possible repair.



New section set in place.

Section CHAIN-LOCKED and joint sealed for water tightness.

Excess metal is dressed by grinding and made to conform to original contours of block.



Painted and ready to put into service. The repaired section is resistant to heat, expansion, and contraction, as well as other strains.

TIME ELAPSED

One week from receipt of block to reinstallation. A minimum of tearing down is required when CHAIN-LOCK repairs are made, thus saving time and money.

RESULTS

Block still in service after TWO YEARS.
CHAIN-LOCK repairs are guaranteed for: Heads, Blocks, Transmission Cases, and other automotive castings of any type metal.

WRITE FOR CATALOG AND NEAREST LICENSEE

DISTRICT OFFICES

WEST
Harman Process Co.
8727 Juniper
Los Angeles 2, Calif.
LOgan 8-7050

MIDWEST
Harman Process Co.
1214 Texas St.
El Paso, Texas
2-8032

EAST
Chain Lock Process Co.
7th and Cheltenham Ave.
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Livingston 8-4230

The man to see is your United Motors Distributor!

ORIGINAL EQUIPMENT
CHASSIS AND ENGINE PARTS FOR

BUICK · *Cadillac* · CHEVROLET
GMC · OLDSMOBILE · PONTIAC

PLUS –

DELCO BATTERIES	**MORAINE** ENGINE BEARINGS	**DELCO** AUTOMOTIVE MOTORS
KLAXON HORNS	**AC** GAUGES · SPEEDOMETERS	*HARRISON* RADIATORS
MORAINE GASOLINE FILTERS	**DELCO** SHOCK ABSORBERS	**ROCHESTER** LIGHTERS
NEW DEPARTURE BALL BEARINGS	**ROCHESTER** CARBURETORS	**Delco-Remy** STARTING, LIGHTING, IGNITION
DELCO BRAKE PARTS AND FLUID	*Saginaw* STEERING	**HYATT** ROLLER BEARINGS
HARRISON THERMOSTATS	*Packard* CABLE PRODUCTS	*Guide* LAMPS
INLITE BRAKE LININGS	GM **HYDRA-MATIC** UNITS AND PARTS	**DELCO** ELECTRONIC PARTS

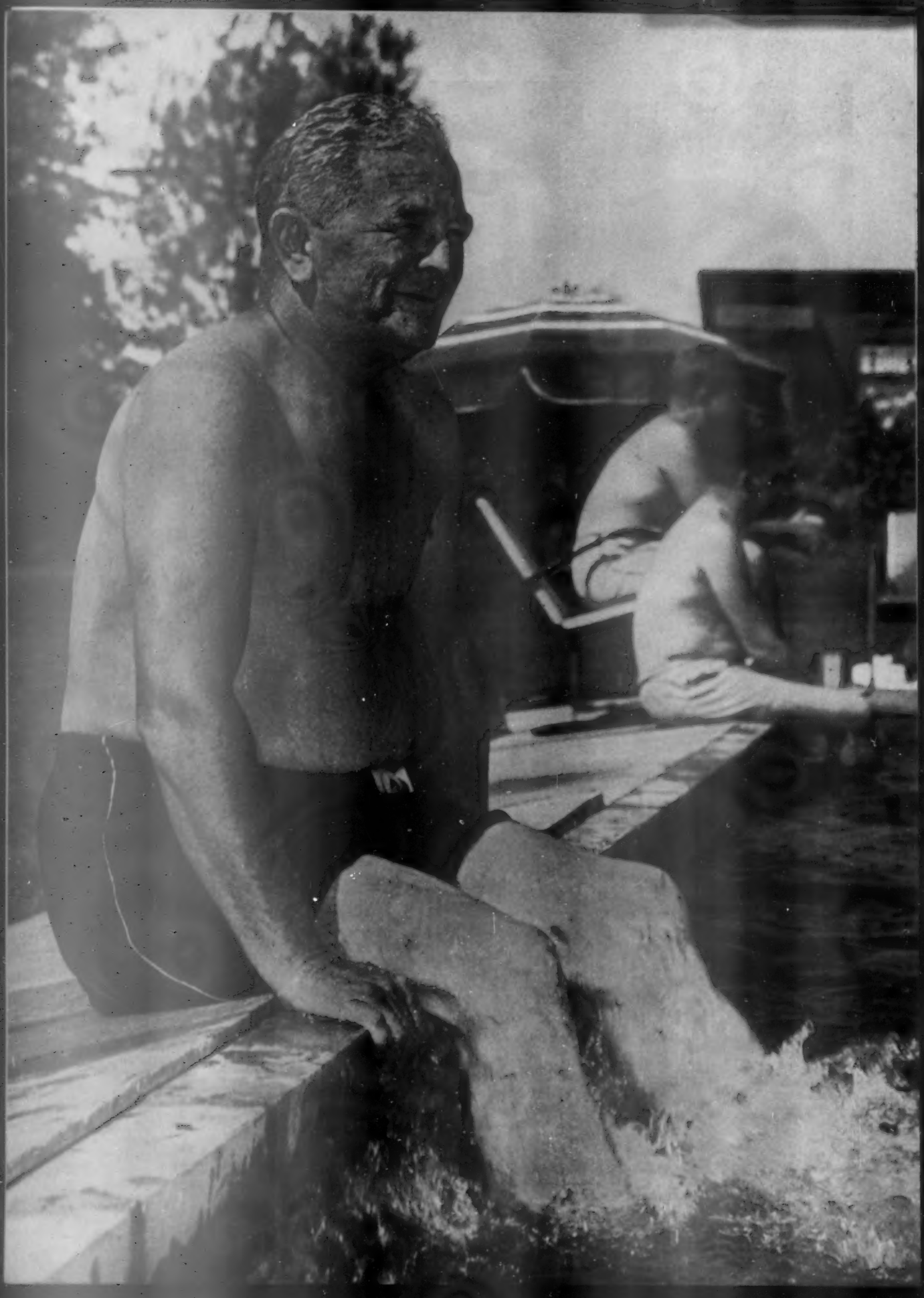
An accurate and efficient parts inventory doesn't have to be a problem! Not for the fleet owner who keeps in close contact with his United Motors Distributor.

There's one near you, wherever you are. His stock of service parts is backed by a nationwide system of GM and UMS parts warehouses that assures you of the right part—right when you want it. AND they are General Motors products. That means they are the same as those used as original equipment on a large percentage of the nation's trucks, buses, and cars. They're your best bet for miles and miles of trouble-free service.

Your United Motors Distributor knows the type and quantity of fast-moving parts that should be stocked to keep vehicle downtime to a minimum. He also knows the answers to a lot of other fleet problems that can save you time and money. Why not talk over your particular problems with him today? There's a UMS Distributor nearby.

★ *Listen to Lowell Thomas on CBS Radio Network—see your newspaper for time and station.*

GENERAL MOTORS PRODUCTS GM SERVICE **UNITED MOTORS LINES**



"From my personal experience I can tell you Auto-Lite STA-FUL Battery scores consistently for us," says Paul G. Viall of The Cleveland Cartage Co.

"STA-FUL is without exception the most dependable battery we've ever used. STA-FUL lasts longer, finishes stronger, keeps the fleet on the road. It helps us get our cost way down.

"There's no question about it here. For dependability our choice is Auto-Lite STA-FUL Battery."

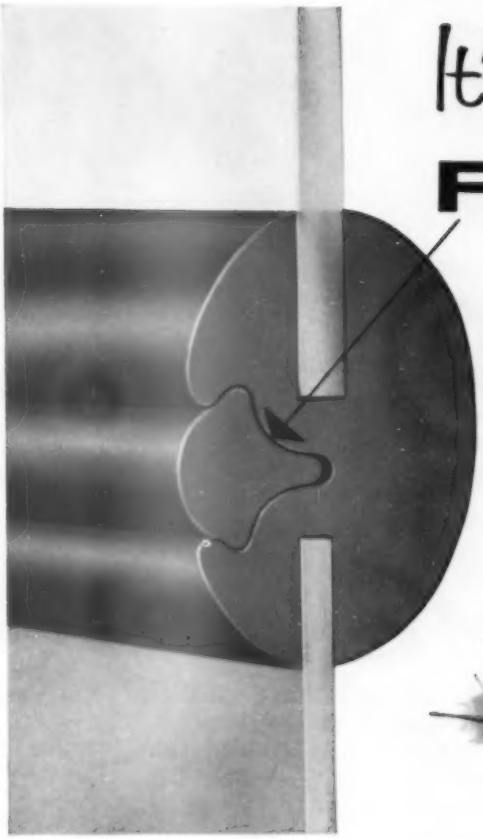
P. G. Viall

Vice President of The Cleveland Cartage Company, Cleveland, Ohio. Mr. Viall's favorite relaxation is swimming in his family's private pool.

You're always right with Auto-Lite

AUTO-LITE BATTERIES

Again OVER 80% OF
MAINTENANCE
AWARD WINNERS
EQUIP THEIR
VEHICLES WITH
RUB-BUB FLOORING
Of 17 city operators receiving 1954 Maintenance Efficiency Awards, 15 properties—a resounding 88%—used Rub-Bub Flooring. This is proof of maximum flooring life . . . of minimum flooring upkeep. So continue to specify Rub-Bub Flooring for all your new or reconditioned vehicles.
RUB-BUB®
Transportation Products
SAMUEL MOORE & CO. MANTUA, OHIO
IN CANADA
SAMUEL MOORE & CO. OF CANADA, LTD.
Represented in Canada exclusively by
RAILWAY & POWER ENG. CORP.



It's this separate **FILLER STRIP**

that puts more pressure on the fence and the glass... providing a permanent leak proof seal!

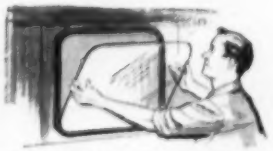
If you're having trouble with windows and windshields that only slow up the rain, then you've probably looked longingly at a competitor's model and asked yourself . . . "how do they do it?" At first glance, their seals seem no different from your own . . . and yet—look closely. See that filler strip? That means they're using Inland's new self-sealing weather strip. No wonder they have no leak problems.

The installer compresses the strip *after* the glass is in place. No more forcing the glass into a groove. What's more, Inland weather strip is, by far, the easiest to install!

INLAND MANUFACTURING DIVISION
General Motors Corporation • Dayton, Ohio

The filler strip makes possible these other Inland advantages!

FREEDOM OF DESIGN! No provision need be made for moldings, channels, binder strips or cement when designing with Inland Self-Sealing Weather Strip.



EASY GLASS REPLACEMENT! Less lost time for vehicles. A one-man job, broken glass can be replaced on the road, if necessary.

A POSITIVE SEAL! This filler strip puts more pressure on the fence and the glass—assures complete, positive weather proofing every time.

VERSATILITY! Ideal for vehicles, booths, trains, gasoline pumps, buildings, marine windows—for positive, permanent sealing of any window or panel!

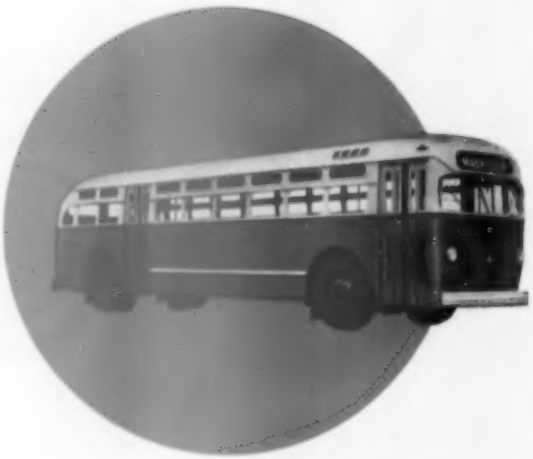
INLAND MANUFACTURING

Self-Sealing

(PATENTED)

WEATHER STRIP

440 NEW MACK FOR San



The City and County of San Francisco, California, has awarded Mack a contract for 440 diesel buses—one of the largest single awards for bus equipment made by any city since World War II.

To people who know San Francisco's steep inclines—with grades up to 19%—this was more than an impressive order; it was a recognition of Mack diesel buses' rugged construction, powerful traction, and economy of operation over extremely difficult terrain.

100 of these modern light-weight units will be delivered during the current year, the balance over the next 5 years. They will provide the ultimate in passenger comfort by having greater headroom, a full 102" width, Mack Evenflow pressure ventilation, and easy-riding air springs.

To negotiate San Francisco's famous hills, these new buses will be powered by Mack Thermodyne® turbo-charged diesels, the most economical, most efficient bus engines in use anywhere today.

BUILT LIKE A MACK...TO OUTEARN THEM ALL

DIESEL BUSES

Francisco!

GOLDEN GATE CITY JOINS THE MACK ECONOMY PARADE

Now add San Francisco to the growing list of large cities that have recently bought modern Mack light-weight buses: Boston . . . Buffalo . . . New York City . . . Seattle . . . San Juan, P. R. . . . Montreal!

Everywhere, these new Mack buses are giving maximum fuel economy and passenger comfort. For only Mack buses offer all these bonuses:

- **Greatest fuel mileage right from the start—up to 28% more mpg! Operate on No. 1 or low-cost No. 2 fuel.**
- **Low maintenance. Operators report hundreds of thousands of profit-making miles before an overhaul is needed.**
- **Actually increased efficiency as service life lengthens.**
- **And all the other outstanding Mack features—air or leaf suspension, Fortress Frame, Evenflow heating and ventilating system, and passenger-minded interiors.**

Compare today's Macks with *any* buses on the road or on the market . . . side by side, feature by feature. You'll certainly agree that for outstanding economy, for passenger comfort and for long dependable service—*Mack's got it!*

Mack
BUSES

MACK MANUFACTURING CORPORATION • **Empire State Building, New York 1, N. Y.**

"Solex makes my job easier"

...says Driver Lloyd Tucker,
Queens City Coach Co., Charlotte, N. C.

Mr. Tucker has chalked up nearly a million miles during the past 17 years . . . and never been charged with an accident. He's also a man who likes Solex Safety Glass. "Solex virtually eliminates glare," says Mr. Tucker, "and that's a big problem down in the Carolinas. It keeps the bus cooler, too. All-in-all, Solex makes driving more comfortable, more relaxing and safer."

You can get Solex in all the well-known types of Pittsburgh Safety Glass — Duplate®, Duolite® and Herculite®—as well as in conventional plate glass.

"I was surprised how Solex windows cut down sun glare"

...says Passenger Sarah Lott,
Baxley, Georgia

We talked with Miss Lott after she had made her first trip in a Solex-equipped bus. "There was snow on the ground and the sun was bright," reported Miss Lott, "but to my surprise there was no sun glare. Another thing about Solex. It did wonders for the mountain scenery . . . everything looked so beautiful through the Solex windows."

Safety and comfort are excellent reasons why you should specify Solex in all your new buses, and replace the glass in your present equipment with Solex. For more information write to the Pittsburgh Plate Glass Company, Room 5285, 632 Fort Duquesne Boulevard, Pittsburgh 22, Pennsylvania.

SOLEX® Safety Glass... *"the best glass under the sun!"*

PAINTS · GLASS · CHEMICALS · BRUSHES · PLASTICS · FIBER GLASS

PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

. . . time-saving Snap-on* Tools can solve your biggest service headaches

Thousands of dealers have found there's a big pay-off in being *personally* concerned with the *kind* of tools in their mechanics' hands.

Taking a man's tool equipment for granted can cost plenty! . . . in man-hour productiveness . . . in customer satisfaction . . . in shop volume and in service profits.

That's truer today than ever before. More cars by millions—*and more advanced cars,* present servicing requirements to challenge the ablest mechanics. Consequently, your profit percentage from shop operations (labor plus parts sold) depends in large measure upon the adequacy of the tools your mechanics are using.

To increase profit percentage do this. See to it that *Snap-on* Service *is covering every man in your shop.* Invite the *Snap-on* Man in, welcome him, endorse him. Do as many profit-minded operators have done . . . ask him to assist in planning the modernization of service tool equipment throughout your shop and, if desired, arrange installment financing for shop or individual mechanics.

You'll be in good company, for in thousands of shops *Snap-on* Service is literally an institution. Service Managers like it. *Mechanics like it.* They have pay-check proof of the earning power of a complete set of the *right* tools.

Ask your shop foreman *now* to notify you next time the *Snap-on* Man calls . . . make profitable use of the service he can render.

SNAP-ON TOOLS CORPORATION

8040-F 28th Avenue • Kenosha, Wisconsin

*Snap-on is the trademark of Snap-on Tools Corporation

Wheels for Tubeless Truck Tires

There have been a good many changes in wheels since the buggy wheel.

Budd has been responsible for initiating many of them. Budd inventiveness, Budd design and Budd manufacturing capabilities have always met any requirement, and have often anticipated them.

So you can be sure that whenever you decide to equip your fleet with tubeless tires, Budd wheels will provide you the most dependable and economical means to obtain the greatest service from them.

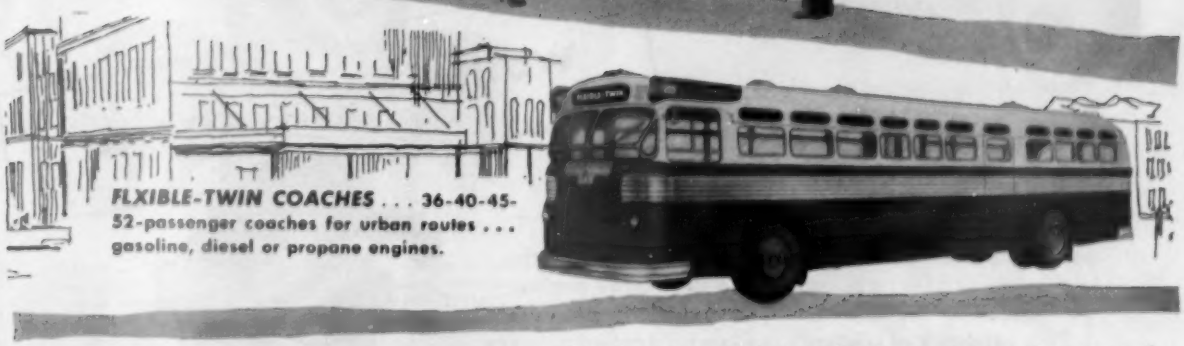
Budd

DETROIT 15

Presenting today's leaders in coach styling!

FLXIBLE VISICOACHES...21 to 37-passenger buses for intercity, airport, suburban and "sightseer" service...gasoline or diesel power.

NEW FLXIBLE 2 LEVEL COACHES... 37 to 45-passenger models for intercity luxury service... diesel or gasoline power.



FLXIBLE-TWIN COACHES . . . 36-40-45-52-passenger coaches for urban routes . . . gasoline, diesel or propane engines.

Flxibles and Flxible-Twins are always available for demonstrations on your property!

On the open road, in suburban areas, at airports and resorts...in the world's largest cities, Flxibles and Flxible-Twins *carry more passengers at lower cost per mile.*

For information about today's finest motor coaches . . . for demonstrations on your own property, we suggest that you call your nearest Flxible representative.

AA-129

THE FLXIBLE COMPANY

LOUDONVILLE, OHIO

IN CANADA, The Flxible Company is represented by Twin Coach of Canada, Ltd., Toronto.

if the BUS OPERATOR built his own buses—

ZENITH CARBURETORS

would be *his* choice

They say it's a buyer's market. Well, the truth is, for the bus operator, it's always been a buyer's market.

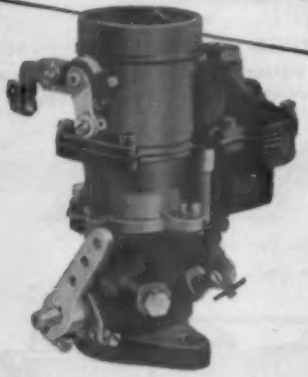
No American businessman sets more exacting standards than the bus operator in his purchase of new equipment. There is good reason for this, for the operator's success or failure is to a very large degree determined by the efficiency of the vehicle he employs.

This yardstick of efficiency is likewise applied to every component part that contributes to bus performance.

That's why you can be certain if bus operators built their own buses, Zenith* would be the choice for standard equipment.

One more reason why—if you build, buy, sell or operate buses, Zenith should be *your* choice for the best in carburetion.

*REG. U.S. PAT. OFF.



ZENITH CARBURETOR DIVISION OF Bendix AVIATION CORPORATION

696 Hart Avenue, Detroit 14, Michigan • Export Sales: Bendix International Division, 205 East 42nd St., New York 17, N. Y.

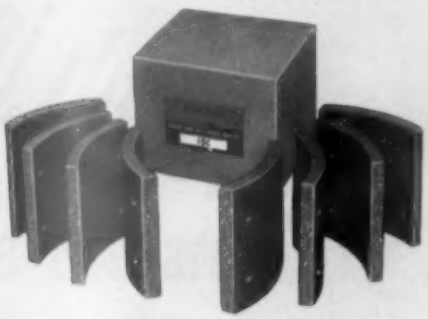
Firestone BUS BRAKE BLOCK Is Tailor-Made For Your Operation...

Firestone has the right brake block or combination of brake blocks (frictions) to handle your particular bus brake problem . . . fade, noise or heat resulting from severe operating conditions.

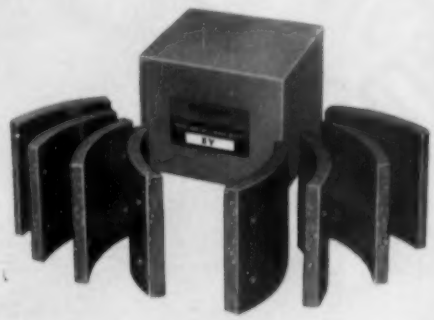
Firestone bus engineered brake blocks will give more safe, dependable stops, quieter operation, minimum drum wear and lower cost-per-mile.

All Firestone Brake Lining is specifically designed to meet U.S. Government Bureau of Standards Specifications HHL-361A.

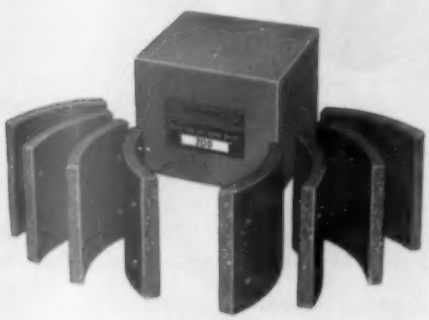
Regardless of operating conditions, your Firestone mileage representative can show you how you can lower your brake mileage costs. For full information write to The Firestone Tire & Rubber Company, Akron, Ohio.



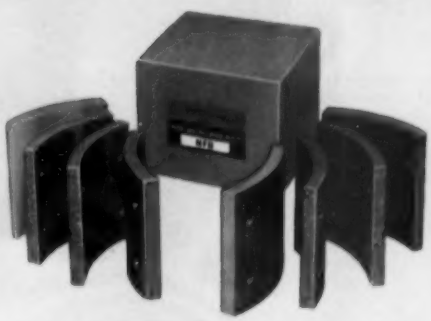
Firestone IDC . . . recommended for tough inter-city service that requires an outstanding job of quick stopping and long mileage under all conditions.



Firestone XY . . . recommended for all normal operations where long wear plus good braking qualities are needed.



Firestone ZOD . . . recommended for trackless trolley buses requiring extra long wear plus good braking qualities. This type is also used in combination with higher friction blocks, to solve many special operating problems, such as balancing lining wear ratio of fronts to rears.



Firestone NFB (No Fade Bus) . . . PREMIUM blocks recommended for severe operating conditions. Gives smooth, fast-acting, cool-running and long-wearing balanced brakes. GUARANTEED against fade; materially reduces heat checking and drum scoring.

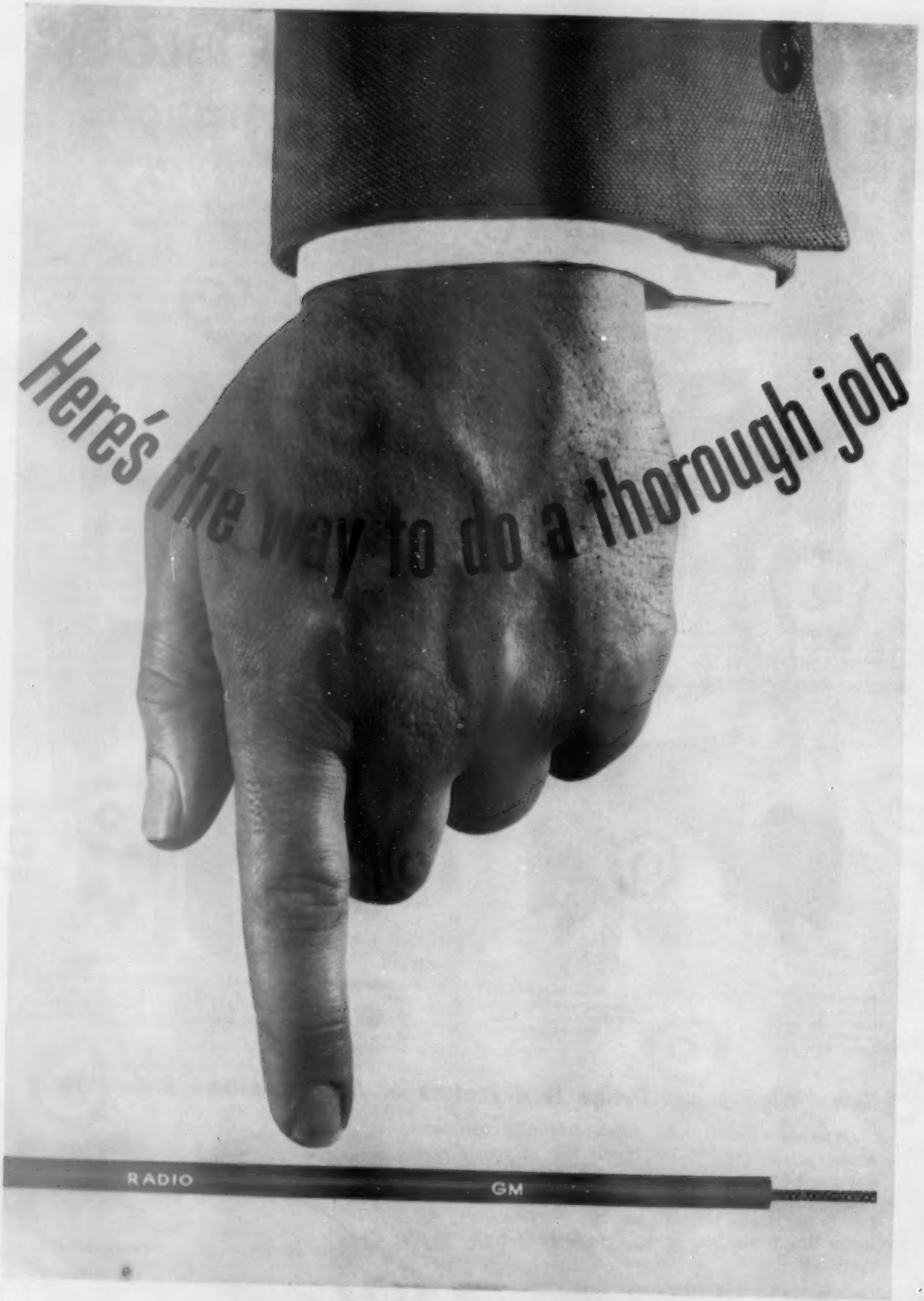
New "Wiper-Edge" Design is a Feature of All Firestone Brake Blocks

The new Firestone Brake Block performs a continuous wiping action which keeps drums free of dirt, grease, water and other materials which often damage drums and lining. The new design also adds 10% more friction surface to the blocks, resulting in more stopping power and longer life. It also strengthens bolt holes at each end of the block.

OLD DESIGN WIPER-EDGE

Enjoy the Voice of Firestone on radio or television every Monday evening over ABC

Copyright 1955, The Firestone Tire & Rubber Co.


Here's the way to do a thorough job
RADIO
GM

# of suppressing ignition interference

Use Packard Television-Radio Suppressor Cable

How often have you tried to do a good suppression job and got poor results? That wasn't your fault. *Now* Packard has something different, something that does a thorough job every time. It's Packard T.V.R.S. cable, which minimizes electrical oscillations throughout most of the ignition system, not at just one point. For the first time, ignition interference with television sets, car radios, airport electronic equipment, and mobile two-way communications systems can be completely suppressed. The secret lies in a Packard non-metallic conductor.

Packard T.V.R.S. cable is supplied in two ways—spooled, and in factory-made sets for some applications. When spooled, it is packed in a kit with an illustrated instruction sheet and all parts needed to make satisfactory terminations, because terminals *cannot* be attached in the usual way.

Packard cable is the Number One cable of the automotive industry—preferred for cars, trucks, buses and tractors. See your Packard jobber for the full story about the exclusive construction features available in the Packard cable line, including these other two members of the "BIG 3" in the cable business . . .

PACKARD BATTERY CABLES—Used on more new cars, trucks, buses, and tractors than any other make. Now Packard battery cables are insulated with Packard's new "809" compound—positive protection against acid, grease, oil and heat. All Packard battery cables are built to deliver full starting power—all enjoy wide acceptance everywhere.

PACKARD LOW-TENSION CABLE—is now available with a new insulation—Packard "404" compound—that withstands oil, heat, age and other cable-destroying conditions as no other insulation can. It strips easily and cleanly, is supplied in various colors, and it costs less than other types. It's original equipment on the majority of cars, trucks, buses and tractors manufactured.

GM GENERAL MOTORS

Packard

REG. U.S. PAT. OFF. TRADE MARK

Packard Electric Division, General Motors, Warren, Ohio

A GENERAL MOTORS PRODUCT — A UNITED MOTORS LINE

DISTRIBUTED BY WHOLESALERS EVERYWHERE

FOREMOST BUILDER OF AUTOMOTIVE WIRING

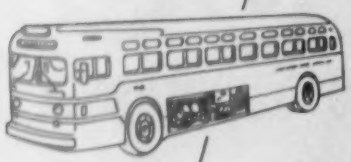
I'D ROAR LIKE A LION IF I HAD TO TRAVEL IN A MOTOR COACH THAT WASN'T AIR CONDITIONED

. . . BY

Carrier

TROPIC-AIRE INC., 5201 W. 65th Street • Chicago 38, Ill.

TROPIC-AIRE, INC., IS A SUBSIDIARY OF McGRAW ELECTRIC CO., CHICAGO



Diesel or gasoline driven, no year-round air conditioning unit in the world is as widely used in the motor coach industry as Tropic-Aire—Carrier!

"150,000 Miles without an overhaul... You just can't beat a MIDLAND Compressor!"

"Smartest thing the boss ever did was standardize on Midland Compressors. Never any oil pumping with them...and man, the miles of good performance they turn in without an overhaul!"

That's Right—Midland Compressors are known by truck and bus operators the world over for their positive, economical performance and their ability to really take it for thousands and thousands of miles without the need for servicing. Midland Compressors give you these big advantages:

Greatest Efficiency—Due to patented automatic inlet valves built into cylinder head.

Minimum Oil Consumption—Due to lack of high vacuum on suction stroke.

Cooler Operation—Because inlet valves let atmospheric air circulate through compressor when idling, practically eliminating carbon.

Integral Governor—Governor mounted on compressor simplifies installation.

Less Weight—A very important factor for today's operators.

Reduced Maintenance—Lack of compressor oil pumping greatly reduces maintenance due to elimination of oil and varnish deposits throughout the entire brake system.

◆ ◆ ◆

For complete details, see your nearest Midland dealer—or write factory direct.

MIDLAND STEEL PRODUCTS COMPANY
3641 E. Milwaukee Ave. • Detroit 11, Michigan
Export Department: 38 Pearl Street, New York, N. Y.

Those Who Know Power Brakes
CHOOSE MIDLAND!

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TORONTO, ONT.

C. I. EARLL COMPANY, Inc.
YORK, PA.

Engine Ignition . . .

Continued from page 55

Look for these same things on the other type of rotor as well, but also check for a fine crack in the spring directly in front of the rivet and at the tip of the spring where in contacts the carbon insert in the cap. Also, if the spring has started to rust, replace the rotor. There's no contact between the rotor and the cap except at this point. Therefore, if you find brass cuttings inside the cap you have trouble somewhere—it may be badly worn parts, the wrong cap, the wrong rotor, or all three.

Lubricating the distributor isn't tricky. A few drops of oil or a little grease on the shaft and a light coating of grease on the cam are all that is necessary.

However, there's one point, often ignored, which needs lubricating. That's the fiber bushing in the moving point where it sets over the pin in the distributor plate. Since it's a fairly common occurrence to find this fiber bushing frozen to the pin, it's important to put a drop of oil at this point every time points are changed or checked.

Filing points, or otherwise trying to true them up or smooth them up in this day and age is strictly the bunk. They are made of tungsten or an alloy of very hard metals . . . and there just ain't no file that will do a job on them. It might be all right for an emergency procedure, but when points are pitted or burned badly enough to be filed you might just as well junk them.

If you true them up on an emery wheel you'll generally find that so much metal has to be removed that there's not enough point left to give service for a reasonable length of time.

If the points are dark gray, black, or pitted, then both points and condenser need replacing. Always check the pig tail, even on a new condenser, where it goes into the condenser case. Make sure that the insulation covers the wire *into* the case.

In conclusion, I'd like to discuss several points that have always seemed rather controversial. One is the so-called persistent burning of points.

In my opinion, this goes hand in hand with excessive burning and arcing, and results in short operating life with frequent point replacement.

In some cases, this can be easily remedied by reversing the primary wires at the coil terminals. However, in the majority of cases this condition comes directly from an out-of-balance ignition system. The coil may be defective, so that excessive current is getting to the points.

On the other hand, you may be trying to increase the efficiency of an engine by replacing the original equipment with larger units, perhaps of larger capacity . . . and thereby throwing your whole ignition system out of whack.

It has been my sad experience over the years that to install larger coils, larger condensers, outside condensers, resistors, etc. never increased the efficiency of anything and generally leads to more trouble than it's worth.

But if you're a fleet superintendent, worried about maintenance costs, one of the most important ideas I'd like to leave is that you check your mechanics carefully to see if they are replacing points when it's not absolutely necessary.

So many mechanics go right directly to the points, replace them regardless of condition, and then find that points weren't the trouble at all.

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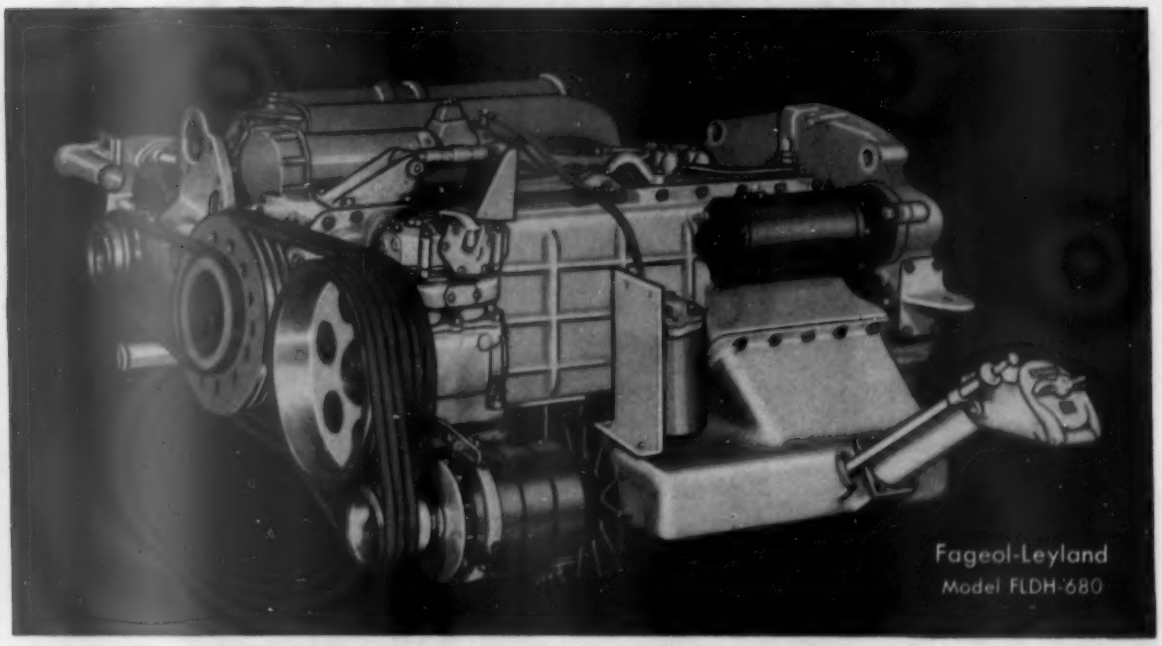

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1955 Buyer's Guide... *continued from page 68*

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National Carbon Co., E. 42nd St., New York 17, N. Y. ("Prestone" "Trek")
Penna. Refining Co., Cleveland 4, Ohio
Publicker Com'l Alcohol Co., Philadelphia, Pa.
*Socony-Vacuum Oil Co., 26 Broadway, New York, N. Y.
Stanley Co., J. T., 642 W. 30th St., New York 16, N. Y.
U. S. Industrial Chemicals Div., Olin-Mathieson Corp., Baltimore, Md.

ANTI-GASSERS

Baron Industries, 241 W. Ave., Los Angeles, Calif.
Bludalk, Inc., 404 West St., New York, N. Y.
Fageol Co., R. D., Detroit, Mich.
*National Pneumatic Co., Boston, Mass.
*Zenith Carburetor Div., Bendix Aviation Corp., Detroit, Mich.

AXLES—See Shafts, Axle and Propeller

BATTERIES, STORAGE

American Bosch Corp., Sprigfield, Mass.
*Auto-Lite Battery Corp., Toledo 1, Ohio
*Bowers Battery & Spark Plug Co., Reading, Pa.
Carlile & Doughty, Inc., Conshohocken, Pa.
*Delco-Remy Div., General Motors Corp., Anderson, Ind.
East Penn Mfg. Co., Lyons Sta., Pa.
*Electric Storage Battery Co., Philadelphia 32, Pa.
*Firestone Tire & Rubber Co., Akron 17, Ohio
*General Tire & Rubber Co., Akron, Ohio
Gill Elec. Mfg. Co., Redlands, Calif.
Globe-Union, Inc., Milwaukee, Wis.
*Goodrich Co., B. F., Akron 18, Ohio
*Goodyear Tire & Rubber Co., Akron, Ohio
Gould Storage Battery Corp., Depew, N. Y.
Hicks Battery Co., Columbus, Ga.
Hobbs Battery Co., San Francisco, Calif
Kathanode Corp., St. Paul, Minn.
*Laher Battery Production Corp., 2619 Magnolia St., Oakland, Calif.
Prest-O-Lite Battery Co., Toledo, Ohio
Sonotone Corp., Elmsford, N. Y.
States Batteries Ltd., San Francisco, Calif.
Surrette Storage Battery Co., Salem, Mass.
*U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.
Vesta Consolidated, Inc., 400 W. Madison St., Chicago, Ill.
*Willard Storage Battery Div., Cleveland 1 Ohio
Witherbee Storage Battery Co., Hamburg Pa.

BATTERY TERMINALS—See Terminals

BEARINGS and BUSHINGS, BRONZE BRONZE-BACKED and DIE CAST

*A. C. Spark Plug Div., General Motors Corp., Flint, Mich.
Automotive Products Corp., Cincinnati 25, Ohio
Bunting Brass & Bronze Co., Toledo, Ohio
*Clevite Service Inc., Cleveland, Ohio
Detroit Aluminum & Brass Corp., Detroit 11, Ohio
Dura-Bond Engine Parts Co., Palo Alto, Calif.
*Federal-Mogul Corp., Detroit 13, Mich.
Gardiner Metal Co., 2514 W. 48th Pl., Chicago, Ill.
Johnson Bronze Co., New Castle, Pa.
McQuay-Norris Mfg. Co., St. Louis, Mo.
*Moraine Products, Div. G.M.C., Dayton, Ohio
Morris Co., J. Leslie, Los Angeles 33, Calif.
Phosphor Bronze Smelting Co., Philadelphia, Pa.
Thompson Products, Inc., Cleveland 3, Ohio

BEARINGS, BALL

Aetna Ball Bearing Mfg. Co., 4600 Schubert Ave., Chicago 39, Ill.
Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.
Ball & Roller Bearing Co., Danbury, Conn.
Bantam Bearings Corp., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Federal Bearings Co., Poughkeepsie, N. Y.
*Federal Mogul Corp., (Bower) Detroit, Mich.
General Motive Parts Co., 160 W. 62nd St., New York, N. Y.
Hoover Ball Bearings Co., Ann Arbor, Mich.
Marlin-Rockwell Corp., Jamestown, N. Y.
New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffman Bearings Corp., Stamford, Conn.
S.K.F. Industries, Inc., Philadelphia 34, Pa.
Torrington Co., Torrington, Conn.

BEARINGS, ROLLER

Bearings Co. of America, Lancaster, Pa.
Bantam Bearings Corp., South Bend, Ind.
Dura Bond Bearing Co., 715 Loma Verde Ave., Palo Alto, Calif.
*Federal Mogul Corp., (Bower)
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Orange Roller Bearing Co., Orange, N. J.
Raritan Bearing Corp., Trenton 4, N. J.
Roller Bearing Co. of America, Trenton, N. J.
Shafer Bearing Corp., 35 E. Wacker Dr., Chicago, Ill.
S.K.F. Industries, Inc., Philadelphia 34, Pa.
*Timken Roller Bearing Co., Canton 6, Ohio
Tyson Bearing Corp., Massillon, Ohio

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BELLS and BUZZERS, PASSENGER SIGNAL—See Signals, Passenger Stop

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Atlas Asbestos Co., N. Wales, Pa.
Continental Rubber Works, Erie, Pa.
Dayton Rubber Mfg. Co., Dayton, Ohio
*Firestone Tire & Rubber Co., Akron, Ohio
*Gates Rubber Co., Denver 17, Colo.
*Goodrich Co., B. F., Akron 18, Ohio
*Goodyear Tire & Rubber Co., Akron 16, Ohio
Graton & Knight Co., Worcester 4, Mass.
*Grey-Rock Div., Raybestos-Manhattan, Manheim, Pa.
Haywood Industries, Dayton, Ohio
Manhattan Rubber Mfg. Div., Raybestos-Manhattan, Inc., Passaic, N. J.
*Raybestos Div., Raybestos-Manhattan, Inc., Bridgeport, Conn.
Russell Mfg. Co., Middletown, Conn.
*Thermoid Co., Trenton, N. J.

BLOCKS, BRAKE—See Lining and Blocks, Brake

BOXES, FARE—See Registers and Devices, Fare Collecting

BRAKES, AIR, HYDRAULIC and VACUUM

Aireon Corp., Kansas City, Kan.
*American Chain & Cable Co., Auto & Aircraft Div., Detroit, Mich.
Auto Specialty & Mfg. Co., St. Joseph, Mich.
*Bendix Products Div. Bendix Aviation Corp., South Bend, Ind.
*Bendix-Westinghouse Automotive Air Brake Co., Elyria, Ohio
Edelmann & Co., E. 2322 W. Logan Blvd., Chicago, Ill.
Empire Electric Brake Co., Newark 7, N. J.
Lambert Disc Brakes Div., Auto Specialties Mfg. Co., Hartford, Mich.
Lathan Co., San Francisco, Calif.
*Midland Steel Products Co., Detroit, Mich.
*Timken-Detroit Axle Co., Ashtabula, Ohio
*Vickers, Inc., Detroit 32, Mich.
*Wagner Elec. Corp., St. Louis 14, Mo.
Warner Electric Brake Mfg. Co., Beloit, Wis.
*Westinghouse Air Brake Co., Wilmerding, Pa.

BRAKES, AUTOMATIC ADJUSTERS

*Trucksville Brake Co., Trucksville, Pa.

BRAKE-FLUID—See Fluid, Hydraulic Brake

BRAKE DRUMS—See Drums, Brake

BUSHINGS—See Bearings and Bushings

BUZZERS—See Signals; Passenger Stop

CABINETS, FIRST AID—See Kits, First Aid

CABLE, IGNITION, STARTING, LIGHTING

American Enameled Magnet Wire Div. Electric Auto-Lite Co., Port Huron, Mich.
Belden Mfg. Co., 4689 W. Van Buren St., Chicago, Ill.
Caldwell Industries, Kent, Ohio
Crescent Co., Pawtucket, R. I.
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General Electric Co., Bridgeport, Conn.
Kem Mfg. Co., Fair Lawn, N. J.
Kerite Co., 30 Church St., New York, N. Y.
Okonite Co., Passaic, N. J.
P & D Mfg. Co., Long Island City, N. Y.
*Packard Electric Div. General Motors Corp., Warren, Ohio
Rockbestos Products Corp., New Haven 4, Conn.
Standard Motors Products, Inc., Long Island City, N. Y.
Whitaker Battery Supply Co., Kansas City, Mo.
*Willard Storage Battery Co., Cleveland 1, Ohio

CARBURETORS

*American Liquid Gas Corp., Los Angeles Calif.
Bendix Products Corp., Stromberg Carburetor Div., South Bend, Ind.
Carter-Carburetor Corp., St. Louis 7, Mo.
Chandler Evans Co., Meridan, Conn.
Ensign Carburetor Co., Huntington Park, Calif.
Exola Products Co., Los Angeles 11, Cal.
Holley Carburetor Co., Detroit, Mich.
*Zenith Carburetor Div. Bendix Aviation Corp., Detroit, Mich.

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Car-Cards, Inc., 415 Lexington Ave., New York City, N. Y.
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National Transitads, 400 N. Michigan Ave., Chicago, Ill.
Nation Wide Bus Advertising Inc., 220 E. 42 St., New York City, N. Y.

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Eagle Machine Co., Indianapolis, Ind.
Hunt Spiller Mfg. Corp., Boston, Mass.
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Nitriliner Co., 4735 S. Talman Ave., Chicago 32, Ill.
*Sealed Power Corp., Muskegon, Mich.
Thompson Products, Inc., Cleveland 3, Ohio
*Toledo Steel Products Co., Toledo 1, Ohio

CEMENT, GASKET

Cabot, Inc., Samuel, Boston, Mass.
Durkee-Atwood Co., Minneapolis, Minn.
*Hollingshead Corp., R. M., Camden, N. J.
Miller Mfg. Co., Camden, N. J.
Pop Mfg. Co., 23 W. 42nd St., New York, N. Y.
Permatex Co., Brooklyn 35, N. Y.
Stanley Co., John T., 642 W. 30th St., New York 16, N. Y.
Wilbur & Williams Co., Boston, Mass.

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Baldwin-Duckworth Div. Chain Belt Co., Springfield, Mass.
D & B Mfg. Co., 2335 S. Michigan Ave., Chicago 1, Ill.
Hoof Products Co., 6543 S. Laramie Ave., Chicago 38, Ill.
Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.
Morse Chain Co., Ithaca, N. Y.
Whitney Chain & Mfg. Co., Hartford, Conn.

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Bridgeport Chain & Mfg. Co., Bridgeport, Conn.
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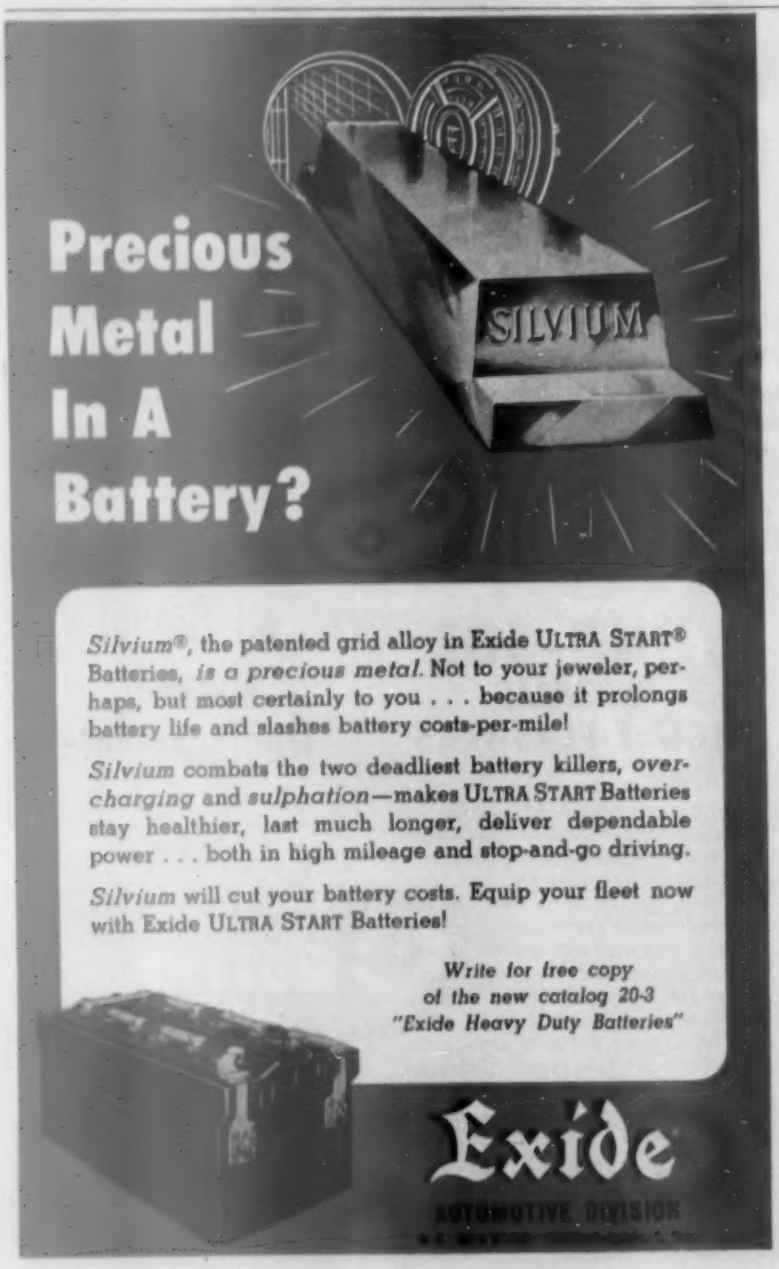
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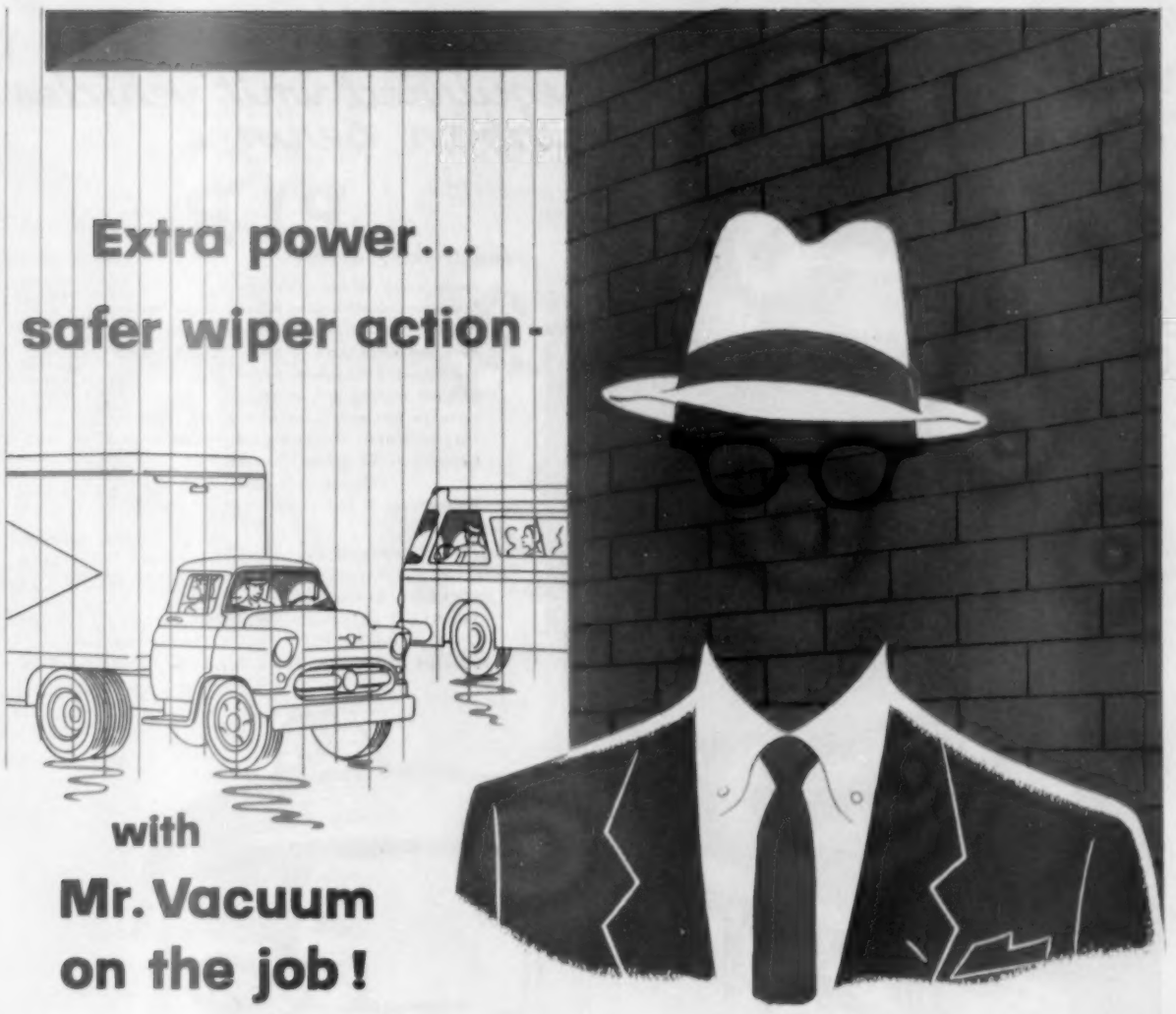

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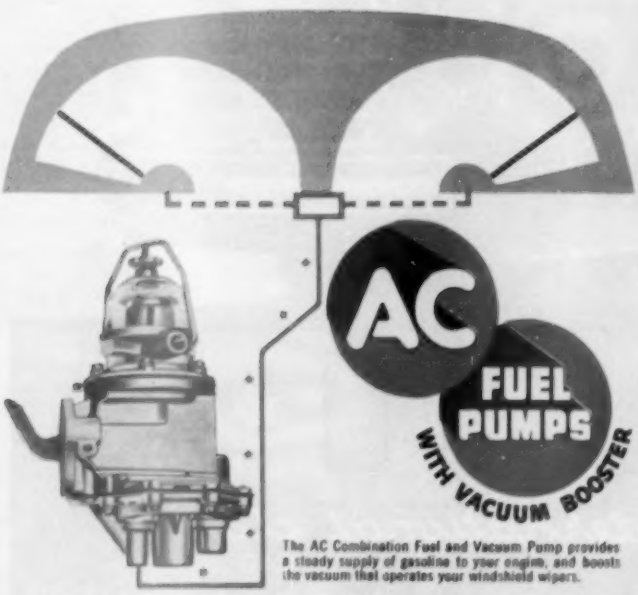

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Round Chain Mfg. Co., Chicago 6, Ill.
Seattle Chain Mfg. Co., Seattle 8, Wash.
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Taylor Chain Co., S. G., Hammond, Ind.
Western Chain Prod. Co., 1809 W. Belmont, Chicago, Ill.
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Pacific States Felt & Mfg. Co., San Francisco, Calif.
Western Felt Works, 4117 Ogden Ave., Chicago 23, Ill.

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*Inland Mfg. Co., Dayton, Ohio
Republic Rubber Div. Lee Rubber & Tire Corp., Youngstown, Ohio
Sponge Rubber Prod. Co., Derby, Conn.

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Marman Products Co., Inglewood, Calif.
Murray Corp., Towson, Md.
National Utilities Corp., 826 S. Arroyo Parkway, Pasadena, Calif.
Screw Machine Products Co., Providence, R. I.
Tinnerman Products, Inc., Cleveland 12, Ohio
Universal Industrial Corp., Hackensack, N. J.
Washburn Co., Worcester, Mass.
Wittek Mfg. Co., 4205 W. 24th Pl., Chicago, Ill.

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Air-Maze Corp., Cleveland 5, Ohio
Burgess Battery Co., 500 W. Huron St., Chicago, Ill.
Donaldson Co., St. Paul, Minn.
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Michiana Products Corp., Michigan City, Ind.
*Purolator Prod. Co., Rahway, N. J.
United Air Cleaner Co., 9705 Cottage Grove Ave., Chicago, Ill.
Vortox & Co., Claremont, Calif.

CLUTCHES—See Facings, Clutch

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Automotive Specialty Corp., Brooklyn, N. Y.
*Delco-Remy Div., General Motors Corp., Anderson, Ind.
DSM Electric Co., 6209 Hamilton St., Detroit, Mich.
Echlin Mfg. Co., New Haven 5, Conn.
*Electric Auto-Lite Co., Toledo 1, Ohio
Kem Mfg. Co., Fairlawn, N. J.
Mallory Electric Co., Detroit 4, Mich.
Niehoff & Co., C. E., 4925 W. Lawrence Ave., Chicago, Ill.
P & D Mfg. Co., Long Island City, N. Y.
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COLLECTORS, FARE—See Registers and Devices, Fare Collecting

COMPOUNDS, PARTS CLEANING—See Solutions, Parts Cleaning

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Lusk Co., C. F., Cleveland, Ohio
*Magnus Chemical Co., Garwood, N. J.
Magnuson Prod. Corp., Brooklyn, N. Y.
Miller Mfg. Co., Camden, N. J.
*Oakite Products, Inc., 22 Thames St., New York 6, N. Y.
Penn Salt Mfg. Co., Philadelphia, Pa.
Petroleum Solvents Corp., 331 Madison Ave., New York 17, N. Y.
Radiator Specialty Co., Charlotte, N. C.

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Fayette Chemical Co., Uniontown, Pa.
*Magnus Chemical Co., Garwood, N. J.
*Oakite Products, Inc., 22 Thames St., New York 6, N. Y.
Sno-Flake Products Co., Detroit, Mich.

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Carborundum Co., Niagara Falls, N. Y.
Clover Mfg. Co., Norwalk, Conn.
Pep Mfg. Co., 32 W. 42nd St., New York 18, N. Y.
Zip Abrasive Co., Cleveland, Ohio

COMPOUNDS, WASHING—See Soap & Detergents

CONSULTING SERVICE—See Management

CONTROLS, CHOKE
Arens Controls, 2550 S. Halsted St., Chicago, Ill.
Bendix Products Corp., Stromberg Carburetor Div., South Bend, Ind.
Imperial Brass Co., Chicago, Ill.
Pierce Governor Co., Anderson, Ind.
Shakespeare Products Co., Kalamazoo, Mich.

CONTROLS, DASH
Arens Controls, 2550 S. Halsted St., Chicago, Ill.
Imperial Brass Mfg. Co., 1220 W. Harrison St., Chicago 7, Ill.
Richland Auto Parts Co., Mansfield, Ohio

CONTROLS, DOOR—See Operators, Pneumatic Door

CONTROLS, ENGINE HEAT—See Thermostats, Water Circulating—also Shutters, Radiator

CONTROLS, FUEL-FILLING
Modern Auto Supply Co., Syracuse, N. Y.
Protectoseal Co., 1958 S. Western Ave., Chicago 7, Ill.
Scully Signal Co., Cambridge, Mass.

CORD, BELL & SIGNAL
Jessall Plastics, Inc., Hartford, Conn.
Puritan Cordage Mills, Louisville, Ky.

COVERINGS, FLOOR
Acme Asbestos Covering & Flooring Co., 1300 W. Fulton St., Chicago 7, Ill.
American Mat Corp., Toledo, Ohio
Armstrong Cork Co., Lancaster, Pa. (Armotlor, Automat, Linoleum, Traffex)
Bird & Son, Inc., Walpole, Mass.
Congoleum-Nairn, Inc., Kearney, N. J. (Congoleum)
*Goodrich Co., B. F., Akron 18, Ohio
*Goodyear Tire & Rubber Co., Akron, Ohio
*Johns-Manville, 22 E. 40th St., New York 16, N. Y. (Composition)
Manhattan Rubber Mfg. Div., Raybestos-Manhattan, Inc., Passaic, N. J.
Mellflex Products Co., Akron 8, Ohio
*Moore & Co., Sam, Mantua, Ohio
Pabco Products, Inc., San Francisco, Calif.
R. C. A. Rubber Co., Akron, Ohio
Sloan, W. & J., 5th Ave. & 47th St., New York, N. Y. (Carpet)
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*U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y. (Rubber Matting)

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Permalux Co., 900 W. Lake St., Chicago, Ill.
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Excello Specialties Co., Cleveland, Ohio
*Meyercord Co., 5323 W. Lake St., Chicago 44, Ill.
National Decalcomania Co., 236 N. 60th St., Phila., Pa.
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American Sand-Banum Co., 9 Rockefeller Plaza, New York, N. Y.
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Electromotive Industries, Inc., Louisville, Ky.
Stanley Co., John T., 642 W. 30th St., New York 16, N. Y.

DIFFERENTIALS—See Gears, Differential

DOORS, AIR OPERATED—See Operators, Pneumatic Door

DRUMS, BRAKE
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Copperweld Steel Co., Glassport, Pa.
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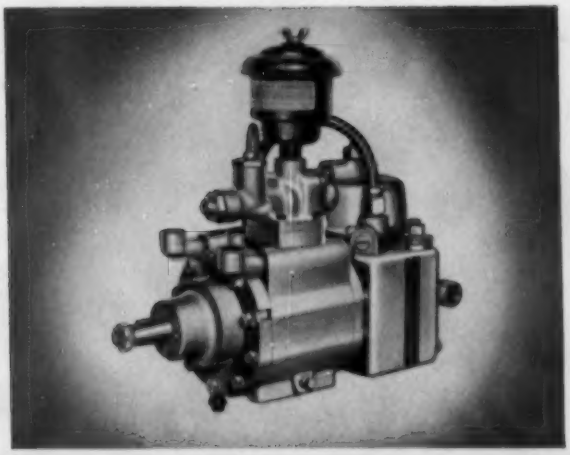

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*Lipe-Rollway Corp., Syracuse, N. Y.
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*Cities Service Co., 60 Wall Tower, New York, N. Y.
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*Ethyl Gasoline Corp., 100 Park Ave., New York, N. Y.
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An important statement about maintenance costs and door control equipment

Nearly every company in the transit industry is being squeezed between rising maintenance costs and low profit margins.

Many companies are already facing a crisis. They are finding it increasingly difficult to get approval of higher fares; yet, their labor and materials costs are out of proportion. These companies are deeply concerned about their future — for maintenance costs are certain to be even higher.

Never before has it been so imperative to pare costs to the minimum.

One prime essential in reducing maintenance costs is *dependable* door control and safety equipment. Cheap equipment can incur costly breakdowns, inefficient and slow runs, and large repair bills.

The very best door control equipment in the industry — *NP* door control equipment — *costs less than 1% of the total cost of a vehicle.* And it gives trouble-free service throughout the entire life of the vehicle. In fact, even after a bus is scrapped, *NP* equipment can often be reused on another bus where it will continue to operate efficiently and economically.

Yet, not all bus manufacturers provide you with "*NP*" equipment — the standard in the industry. *To be sure, you must specify "NP" Equipment.*

Compromising with anything less than "*NP*" is shortsighted economy. Why take chances?

Compare *NP* Door Control and Safety Equipment with all others . . . the *NP* Rack and Gear Door Engine, for example.

This unit is lightweight, compact, and is designed for one-pipe operation. Its speed is easy to adjust; the piston assemblies are fully gasketed to prevent leakage of air pressure. The copper-tube air lines are connected directly to the engine; no flexible connections or pressure regulators are required.

This *NP* Rack and Gear Door Engine is also interchangeable at either entrance or exit doors — a standard feature of most *NP* equipment. The new *NP* Door Control Valve is another typical time-saver. It incorporates a mounting block which, once installed in the coach and connected to the air lines, needs *never* be removed. This arrangement *cuts removal time from 3 hours to 3 minutes!*

You save in many ways when you specify *NP* Door Control and Safety Equipment. Savings start with the reasonable price, and continue through the years, thanks to this high-quality equipment's efficient, trouble-free service. Dependable *NP* equipment helps keep your bus on the road.

BE SURE... ALWAYS SPECIFY NP DOOR CONTROL AND SAFETY EQUIPMENT

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HEATERS, ENGINE

Bridgeport Thermostat Co., Bridgeport, Conn.
*Consolidated Metal Products Corp., Albany, N. Y.
Hunter & Co., Cleveland, Ohio
Kim Hotstart Mfg. Co., Spokane 1, Wash.
Perfection Stove Co., Cleveland, Ohio
Ross Heater & Mfg. Co., Inc., Buffalo 13, N. Y.
Schaver Mfg. Co., Rossmoyne, Ohio
*Surface Combustion Corp., Columbus 16, Ohio

HEATERS—Also See Shop Equipment Section

HOSE, AIR, TIRE INFLATING, RADIATOR and WATER

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Continental Rubber Works, Erie, Pa.
Dayton Rubber Mfg. Co., Dayton, Ohio
*Firestone Tire & Rubber Co., Akron, Ohio
*Gates Rubber Co., Denver 17, Colo.
*Goodrich Co., B. F., Akron 18, Ohio
*Goodyear Tire & Rubber Co., Akron 16, Ohio
Haywood Industries, Dayton, Ohio.
Manhattan Rubber Mfg. Div. Raybestos-Manhattan, Inc., Passaic, N. J.
*Moore & Co., Sam, Mantua, Ohio
*Raybestos Div., Raybestos-Manhattan, Inc., Bridgeport, Conn.
*Thermoid Co., Trenton, N. J.
*U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.
Weatherhead & Co., Cleveland 8, Ohio

INJECTORS, FUEL & LUBE—See Pumps and Injectors

INSULATION, BODY

Alfoil Insulation Co., 155 E. 44th St., New York 17, N. Y.
American Felt Co., Glenville, Conn.
American Hair & Felt Co., Merchandise Mart, Chicago 5A, Ill.
Armstrong Cork Co., Lancaster, Pa.
Burgess Battery Co., 560 W. Huron St., Chicago, Ill.
Celotex Corp., 919 N. Michigan Ave., Chicago 3, Ill.
Dow Chemical Co., Midland, Mich.
Dry-Zero Corp., Merchandise Mart, Chicago, Ill.
Felters Co., Boston, Mass.
Glass Fibres, Inc., Toledo, Ohio
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Insulite Div., Minnesota & Ontario Paper Co., Minneapolis 2, Minn.
Libbey-Owens-Ford Co., Toledo, Ohio
Masonite Corp., 111 W. Washington St., Chicago, Ill.
Owens-Corning Fiberglass Corp., Toledo, Ohio
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Seaman Paper Co., 220 W. Adams St., Chicago, Ill.

INSURANCE

American Mutual Ins. Co., Boston, Mass.
*American Transportation Ins. Co., Kansas City, Mo.
Continental Casualty Co., Chicago, Ill.
Joyce & Co., Inc., 105 W. Adams St., Chicago, Ill.
Liberty Mutual Ins. Co., Boston, Mass.
Markel Service, Inc., Richmond, Va.

JOINTS, UNIVERSAL

Bendix Products Div., Bendix Aviation Corp., South Bend, Ind.
Blood Bros. Machine Div., Standard Steel Spring Co., Allegan, Mich.
Mechanics Universal Joint Div., Borg-Warner Corp., Rockford, Ill.
Morse Chain Co. Ithaca, N. Y.
New England Auto Products Corp., Pottstown, Pa.
New Process Gear, Inc., Syracuse, N. Y.
*Spicer Mfg. Div. of Dana Corp., Toledo, O.
Universal Products Co., Dearborn, Mich.

KITS, FIRST AID

Baner & Black Div., Kendall Co., 2500 S. Dearborn St., Chicago, Ill.
Bullard Co., E. D., San Francisco, Calif.
Burroughs Welcome & Co., 9 E. 41st St., New York 17, N. Y.
Johnson & Johnson, New Brunswick, N. J.
Mine Safety Appliances Co., Pittsburgh, Pa.

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LABELS, IDENTIFICATION

Brady Co., W. H., Milwauke 3, Wis.

LAMPS, FOG and DITCH

American Bosch Corp., Springfield, Mass.
Appleton Electric Co., 1701 W. Wellington Ave., Chicago, Ill.
Arrow Safety Device Co., Mt. Holly, N. J.
Auto Lamp Mfg. Co., 2909 Indiana Ave., Chicago 16, Ill.
Betts Mfg. Co., Warren, Pa.
Dietz Co., R. E., 225 Wilkinson St., Syracuse 1, N. Y.
Do-Ray Lamp Co., 1458 S. Michigan Ave., Chicago 5, Ill.
*Electric Auto-Lite Co., Toledo, Ohio
*Electric Service Mfg. Co., Philadelphia 32, Pa.
Griffin Lamp Co., Hamilton, Ohio
Grote Mfg. Co., Bellevue, Ky.
*Guide Lamp Div., G.M.C., Anderson, Ind.
K-D Lamp Co., Cincinnati, Ohio
Miro-Flex Co., Wichita, Kan.
S & M Lamp Co., Los Angeles 54, Calif.
Sparks Withington, Jackson, Mich.
Teleoptic Co., Racine, Wis.
Unity Mfg. Co., 2909 Indiana Ave., Chicago, Ill.
Yankee Metal Prods. Co., Norwalk, Conn.

LAMPS, HEAD, TAIL and MARKER

American Automatic Devices Co., 530 S. Throop St., Chicago, Ill.
Arrow Safety Device Co., Mt. Holly, N. J.
Auto Lamp Mfg. Co., 2909 Indiana Ave., Chicago 16, Ill.
Betts Mfg. Co., Warren, Pa.
Dietz Co., R. E., 225 Wilkinson St., Syracuse, N. Y.
Do-Ray Lamp Co., 1458 S. Michigan Ave., Chicago 5, Ill.
*Electric Auto-Lite Co., Toledo, Ohio
*Electric Service Mfg. Co., Philadelphia, 32, Pa.
General Elec. Co., Cleveland, Ohio
Griffin Lamp Co., Hamilton, Ohio
Grote Mfg. Co., Bellevue, Ky.
*Guide Lamp Div., General Motors Corp., Anderson, Ind.
Hall Lamp Co., C. M., Detroit 7, Mich.
K-D Lamp Co., Cincinnati, Ohio
Monroe-Acme Co., 215 N. Aberdeen St., Chicago, Ill.
Signal Stat Corp., Brooklyn, N. Y.
S & M Lamp Co., Los Angeles 54, Calif.
Sparks-Withington Co., Jackson, Mich.
Trippe Mfg. Co., 609 W. Lake St., Chicago, Ill.
Vari Products Corp., 2450 S. Prairie Ave., Chicago 16, Ill.
Yankee Metal Prods. Co., Norwalk, Conn.

LAMPS, INTERIOR—See Fixtures and Fittings, Lamp

LAMPS, MINIATURE INCANDESCENT

General Electric Co., Lamp Dept., Cleveland 12, Ohio
Herzog Miniature Lamp Works, Long Island City, N. Y.
National Carbon Co., 30 E. 42nd St., New York 17, N. Y.
North American Electric Lamp Co., St. Louis 6, Mo.
Sylvania Electric Products Co., 500 Fifth Ave., New York 18, N. Y.
Trippe Mfg. Co., 609 W. Lake St., Chicago, Ill.
*Tung-Sol Electric Corp., Newark 4, N. J.
Westinghouse Electric Corp., Bloomfield, N. J.

LEATHER, ARTIFICIAL

Chicopee Mfg. Co., 47 Worth St., New York, N. Y.
*du Pont de Nemours & Co., E. I., Wilmington, Delaware
Firestone Industrial Products Co., Akron, Ohio
Goodall Fabrics, Div. Burlington Mills Corp., 350 Fifth Ave., New York, N. Y.
*Goodrich Co., B. F., Akron 18, Ohio
Hooper & Sons Co., W. E., Philadelphia, Pa.
Masland Duraleather Co., Philadelphia, Pa.
Pantasote Co., 444 Madison Ave., New York, N. Y.
Reeves Bros. Co., 54 Worth St., New York, N. Y.
Susquehanna Mills, Inc., 404 Fourth Ave., New York, N. Y.
Textileather Corp., Toledo 4, Ohio
*U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.

LEATHER, NATURAL

Astabula Hide & Leather Co., Astabula, Ohio
Blanchard Bros. & Lane, Newark, N. J.
Eagle-Ottawa Leather Co., Grand Haven, Mich.
General Leather Co., Newark, N. J.
Lackawanna Leather Co., Hackettstown, N. J.
Radel Leather Mfg. Co., Newark, N. J.

LININGS and BLOCKS, BRAKE

*American Brake Shoe Co., American Brakeblok Div., Detroit, Mich.
Anchor Packing Co., Philadelphia, Pa.
Asbestos Mfg. Co., Huntington, Ind.
Atlas Asbestos Co., North Wales, Pa.
*Bendix Marshall-Eclipse, Troy, N. Y.
Fibre & Metal Products, Inc., Downey, Calif.
*Firestone Tire & Rubber Co., Akron, Ohio
Gatke Corp., 228 N. LaSalle St., Chicago, Ill.
General Metals Powder Co., Akron, Ohio
*Goodyear Tire & Rubber Co., Akron 16, Ohio
*Grey-Rock Div., Raybestos-Manhattan, Inc., Manheim, Pa.
Grizzly Mfg. Co., Paulding, Ohio
*Inland Mfg. Div., General Motors Corp., Dayton, Ohio
*Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Lasco Brake Product Corp., Ltd., 2619 Magnolia St., Oakland, Calif.
Manhattan Rubber Mfg. Div., Raybestos-Manhattan, Inc., Passaic, N. J.
Miley Co., L. J., 1060 W. Adams St., Chicago, Ill.
Molded Materials, Inc., Philadelphia, Pa.
*Raybestos Div., Raybestos-Manhattan, Inc., Bridgeport, Conn.
Reddaway Brake Lining Co., Newark, N. J.
Russell Mfg. Co., Middletown, Conn.
Scandinavia Belting Co., Newark, N. J.
Southern Friction Materials Co., Charlotte, N. C.
*Thermoid Co., Trenton, N. J.
*Wagner Electric Corp., St. Louis 14, Mo.
Wellman Co., S. K., Cleveland, Ohio
World Bestos Corp., New Castle, Ind.

LUBRICATORS—See Pumps and Injectors

MACHINES, VENDING

Transportation Vendors, Inc., 60 Park Pl., Newark 2, N. J.

MANAGEMENT, CONSULTING, FINANCIAL SERVICES

The Omnibus Corp., 134 N. La Salle, Chicago 2, Ill.

MIRRORS, REAR VISION

Acme Specialty Mfg. Co., Toledo, Ohio
American Automatic Devices Co., 530 S. Throop St., Chicago, Ill.
Anzell Specialty Mfg. Co., Brooklyn, N. Y.
Arrow Safety Device Co., Mt. Holly, N. J.
Dietz Co., R. E., 225 Wilkinson St., Syracuse 1, N. Y.
Do-Ray Lamp Co., 1458 S. Michigan Ave., Chicago 5, Ill.
*Electric Service Mfg. Co., Philadelphia 32, Pa.
Grote Mfg. Co., Bellevue, Ky.
K-D Lamp Co., Cincinnati, Ohio
Miro-Flex Co., Wichita, Kan.
Monroe-Acme Co., 215 N. Aberdeen St., Chicago, Ill.
Sparks-Withington Co., Jackson, Mich.
Stout Mfg. Co., Connersville, Ind.
Trico Products Corp., Buffalo, N. Y.
Speaker & Co., J. W., Milwaukee, Wis.
Yankee Metal Prods. Co., Norwalk, Conn.
Whitehead Stamping Co., Detroit, Mich.

MUFFLERS, EXHAUST

A. P. Parts Co., Toledo, Ohio
Buffalo Pressed Steel Co., Youngstown 9, Ohio
Burgess Battery Co., Acoustic Div., 500 W. Huron St., Chicago, Ill.
International Nickel Co., New York, N. Y.
Maremont Automotive Products, Inc., 8 Ashland Ave., at 17th, Chicago, Ill.
Maxim Silencer Co., Hartford, Conn.
*McCord Corp., Detroit, Mich.
Powell Muffler Co., Chicago, Ill.
Tech Muffler Co., Columbus, Ohio
Walker Mfg. Co., Racine, Wis.

OPERATORS, PNEUMATIC DOOR

Bendix Products Div., Bendix Aviation Corp., South Bend, Ind.
Broten Controls, Inc., Rahway, N. J.
*Consolidated Metal Products Corp., Albany, N. Y.
Electrol, Inc., Kingston, N. Y.
*Midland Steel Products Co., Detroit 11, Mich.
*National Pneumatic Co., 125 Amory St., Boston, Mass.

OVERHEAD, TROLLEY BUS

*Earll Co., C. I., York, Pa.
*Ohio Brass Co., Mansfield, Ohio
Westinghouse Elec. Corp., Pittsburgh, Pa.

OXYGEN and GAS, COMPRESSED

Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.
Prest-O-Lite Co., 30 E. 42nd St., New York 17, N. Y.
Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

PAINT, ENAMEL and LACQUER

Acme White Lead & Color Works, Detroit, Mich.
American-Marietta Co., East Ohio St., Chicago 11, Ill.
Arco Co., Cleveland, Ohio
Ditzler Color Div., Pittsburgh Plate Glass Co., Detroit, Mich.
Dolphin Paint & Varnish Co., Toledo, Ohio
*du Pont de Nemours & Co., E. I., Wilmington, Del.
Egyptian Lacquer Mfg. Co., 1270 Sixth Ave., New York, N. Y.
Fuller & Co., W. P., San Francisco 5, Calif.
Glidden Co., Cleveland 14, Ohio
Hercules Powder Co., 959 King St., Wilmington 99, Del.
Interchemical Corp., Newark 1, N. J.
Martin-Senour Co., 2520 Quarry, Chicago 8, Ill.
McDougall-Butler Co., Buffalo, N. Y.
Midland Paint & Varnish Co., Cleveland 5, Ohio
Monsanto Chem. Co., Merrimac Div., Boston, Mass.
Nason & Co., R. N., San Francisco 3, Calif.
Pabco Products Inc., San Francisco, Calif.
Patterson Sargent Co., Cleveland, Ohio
*Pittsburgh Plate Glass Co., Pittsburgh 22, Pa.
Pratt & Lambert, Inc., Buffalo, N. Y.
Rinshed-Mason Co., Detroit 10, Mich.
Sherwin-Williams Co., Cleveland 1, Ohio
Sonneborn Sons, L., 88 Lexington Ave., New York, N. Y.
Valentine & Co., 11 E. 36th St., New York 16, N. Y.
Walker Co., H. V., Elizabeth, N. J.
Zapon Div. Atlas Powder Co., Stamford, Conn.

PANELS and FABRICATIONS, BODY

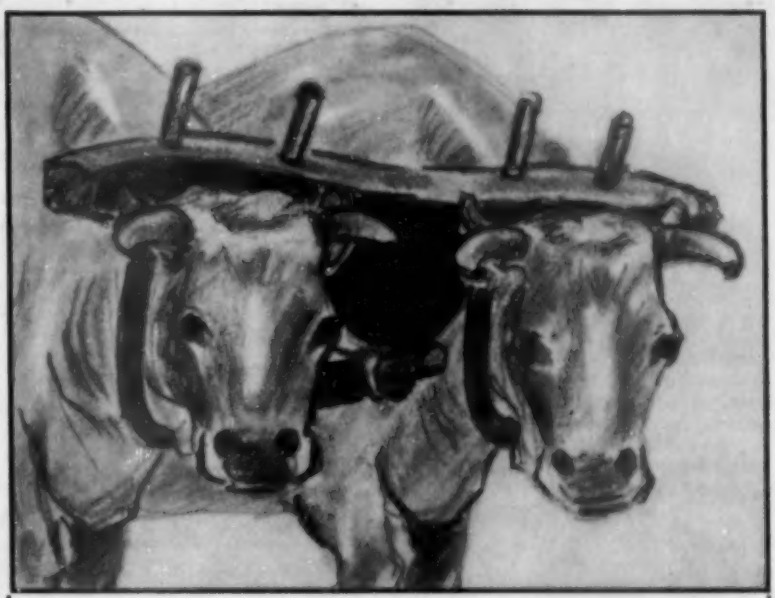
Alan Wood Steel Co., Conshohocken, Pa.
Algoma Plywood & Veneer Co., Algoma, Wis.
*Aluminum Co. of America, Pittsburgh 19, Pa.
American Hair & Felt Co., Merchandise Mart, Chicago, Ill.
American Rolling Mills Co., Middletown, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Buhelen Lumber & Mfg. Co., Tacoma, Wash.
Formica Insulation Co., Cincinnati 32, Ohio
Great Lakes Steel Co., Ecorse, Mich.
Harbor Plywood Corp., Hoquiam, Wash.
Hart Metal Products Co., Elkhart, Ind.
*Haskelite Mfg. Corp., Grand Rapids 2, Mich.
International Nickel Co., 67 Wall St., New York 5, N. Y.
*Kaiser Aluminum & Chemical Sales Corp., Oakland, Calif.
Masonite Co., 111 W. Washington St., Chicago, Ill.
Nicralumin Co., Wilmington, Del.
Noblitt-Sparks Industries, Columbus, Ind.
Republic Steel Corp., Cleveland 1, Ohio
*Reynolds Metals Co., Louisville, Ky.
*Rigidized Metals Corp., 6726 Ohio St., Buffalo, N. Y.
St. Regis Paper Co., 230 Park Ave., New York 17, N. Y.
Snedaker & Co., F. C., Philadelphia 40, Pa.
Superior Sheet Steel Co., Canton, Ohio
U. S. Plywood Corp., 616 W. 46th St., New York 19, N. Y.
U. S. Steel Corp., Pittsburgh, Pa.
Washington Veneer Co., Olympia, Wash.
Youngstown Sheet & Tube Co., Youngstown, Ohio

PANELS, FUSE and JUNCTION BLOCKS

Rohden Mfg. Co., 4739 Montrose Ave., Chicago 41, Ill.

PISTONS and PINS

*Aluminum Co. of America, Pittsburgh 19, Pa.
Aluminum Industries, Inc., Cincinnati 25, Ohio
Arrow Head Steel Products Co., Howell, Mich.
Burgess-Norton Mfg. Co., Geneva, Ill.
Deluxe Products Corp., La Porte, Ind.
D.S.C. Industries, Inc., Medina, Ohio
Elgin Machine Works, Elgin, Ill.
Gillett & Eaton, Inc., Lake City, Minn.
King Quality Products Co., St. Louis, Mo.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Ohio Piston Corp., Cleveland, Ohio
*Sealed Power Corp., Muskegon, Mich.



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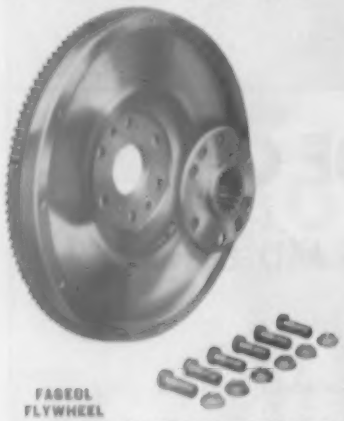

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United Engine & Mach. Co., San Leandro, Calif.
Wisconsin Machinery & Mfg. Co., West Allis, Wis.
*Zollner Mach. Works, Fort Wayne, Ind.

PLATES, STEP (Non-Skid)

Alan Wood Steel Co., Conshohocken, Pa.
American Abrasive Metals Co., Irvington., N. J.
*Attwood Brass Works, Grand Rapids 4, Mich.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Meiflex Products Co., Akron 8, Ohio
*Moore & Co., Sam, Mantua, Ohio
Monroe-Acme Co., 215 N. Aberdeen St., Chicago, Ill.
Morton Mfg. Co., 5105 W. Lake St., Chicago 44, Ill.
Turner Brass Works, Sycamore, Ill.

PLOWS, SNOW

Flink Co., Streator, Ill.
Good Roads Machinery Corp., Kennett Square, Pa.
Walter Truck Co., Brooklyn, N. Y.

POLISH, BODY and METAL

Commercial Chem. Co., Charlestown, Mass.
*du Pont de Nemours & Co., E. I., Wilmington, Del.
Franko Super Polish Products, Lyndhurst, N. J.
*Hollingshead Corp., R. M., Camden, N. J.
Jewel Paint & Varnish Co., 345 N. Western Ave., Chicago, Ill.
Minnesota Mining & Mfg. Co., St. Paul 6, Minn.
Paul & Co., J. C., 930 Roscoe St., Chicago, Ill.
Park Chemical Co., Detroit, Mich.
Permatex Co., Brooklyn 35, N. Y.
Puritan Co., Rochester, N. Y.
Robertson Products Co., Theo. B., 700 W. Division, Chicago, Ill.
Sherwin-Williams Co., Cleveland 1, Ohio
Simoniz Co., 2100 S. Indiana Ave., Chicago 16, Ill.
Sno-Flake Products Co., Detroit, Mich.
Stanley Co., J. T., 642 W. 30th St., New York 16, N. Y.
Wilson Imperial Co., Newark, N. J.
Zinc Corp., Howard, Fremont, Ohio

PUMPS and INJECTORS, FUEL and LUBE

*A. C. Spark Plug Div., General Motors Corp., Flint, Mich.
American Bosch Corp., Springfield, Mass.
American Diesel Service, 7606 Lorain Ave., Cleveland 2, Ohio
Automotive & Marine Products Co., Boston, Mass.
Autopulse Corp., Ludington, Mich.
*Bendix, Eclipse Machine, Elmira, N. Y.
Carter Carburetor Corp., St. Louis, Mo.
Emerol Mfg. Co., 242 W. 49th St., New York, N. Y.
*Evans Products Co., Detroit 27, Mich.
Ex-Cell-O Corp., Detroit, Mich.
Stewart-Warner Corp., 1826 W. Diversey Parkway, Chicago 14, Ill.

PLYWOOD-MOLDED SHAPES

United States Molded Shapes, Inc., Grand Rapids, Mich.

RADIATORS, ENGINE COOLING

Excel Auto Radiator Co., 320 E. 21st Chicago, Ill.
Fedders Mfg. Co., Buffalo, N. Y.
Fleet Sales & Service Co., Mt. Vernon, N. Y.
Flexo Mfg. Co., Los Angeles, Calif.
G & O Mfg. Co., New Haven, Conn.
Harrison Radiator Div., General Motors Corp., Lockport, N. Y.
Lasko Metal Products, West Chester, Pa.
Lake Auto Radiator Mfg. Co., The, Cleveland 3, Ohio
*Long Mfg. Div., Borg-Warner Corp., Detroit, Mich.
*McCord Corp., Detroit, Mich.
Modine Mfg. Co., Racine, Wis.
Perfex Corp., Milwaukee, Wis.
Young Radiator Co., Racine, Wis.

RADIO and ACCESSORIES, MOBILE

Bendix Aviation Corp., Towson, Md.
Communications Co., Coral Gables, Fla.
Farnsworth Television Radio Corp., Fort Wayne 1, Ind.
Federal Telephone & Radio Corp., Clifton, N. J.
General Electric Co., Syracuse, N. Y.
Hallett Mfg. Co., Inglewood, Calif.
Link Radio Corp., 135 W. 17th St., New York, N. Y.
*Mid-West Audio Service, Box 354, Park Ridge, Ill.
Motorola Inc., 4545 W. Augusta Blvd., Chicago, Ill.
Radio Corp. of America, Camden, N. J.
Sylvania Electric Products, Inc., Salem, Mass.
Transit Radio, Cincinnati 14, Ohio
Westinghouse Elec. Corp., Pittsburgh Pa.
Zenith Radio Corp., 6000 Dickens Ave., Chicago, Ill.

REGISTERS and DEVICES, FARE COLLECTING

Advance Products Co., Detroit, Mich.
Burroughs Adding Mach. Co., Detroit, Mich.
*Electric Service Mfg. Co., Philadelphia 32, Pa.
Galef & Son, J. L., 85 Chambers St., New York, N. Y.
General Register Co., Long Island City, N. Y.
*Grant Money-Meters Co., Providence, R. I.
International Register Co., 2620 Washington Blvd., Chicago, Ill.
*Johnson Fare Box Co., 4619 N. Ravenswood Ave., Chicago, Ill.
Knopf Inst. Co., Jersey City, N. J.
Lannon Products Corp., Nashville 3, Tenn.
Main Farebox Co., Willoughby, Ohio
Oliver Mach. Tool Co., 520 S. Michigan Ave., Chicago 11, Ill.
*Perey Turnstile Co., 101 Park Ave., New York 17, N. Y.
*Rockwell Register Corp., Belle Fonte, Ohio
Veeder-Root, Inc., Hartford 2, Conn.

RINGS, PISTON

Aluminum Industries, Inc., Cincinnati 25, Ohio
American Hammered Piston Ring, Div. Muskegon, Mich.
Arrow Head Steel Prod. Co., Howell, Mich.
Burd Piston Ring Co., Rockford, Ill.

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*Hastings Mfg. Co., Hastings, Mich.
King Quality Products Co., St. Louis, Mo.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Hoog-St. Louis Piston Ring Co., St. Louis, Mo.
*Perfect Circle Co., Hagerstown, Ind.
Ramsey Accessories Mfg. Corp., St. Louis, Mo.
*Sealed Power Corp., Muskegon, Mich.
Simplex Products Corp., Cleveland, Ohio
Thompson Mfg. Co., Peoria, Ill.
Thompson Products, Inc., Cleveland 3, Ohio
U. S. Hammered Piston Ring Co., Sterling, N. J.
Wausau Motor Parts Co., Wausau, Wis.
Wilkening Mfg. Co., Philadelphia, Pa.

RODS, CONNECTING

*Federal-Mogul Corp., Detroit 13, Mich.
Janibor Tool & Stamping Co., Milwaukee, Wis.
Morris, Inc., J. Leslie, Los Angeles 33, Calif.
Niagara Motors Corp., Dunkirk, N. Y.

RUBBER TO METAL BONDING

*Motor Devices Corp., 772 Tenth Ave., New York 17, N. Y.
Metro Rubber Products Corp., Oak Lawn, Ill.

SANDERS, HIGHWAY

Anderson Mach. & Tool Wks. Inc., Chaska, Minn.
Connecticut Telephone & Electric Corp., Meriden, Conn.
Elston Corp., St. Paul, Minn.
Flink Co., Streator, Ill.
Good Roads Machinery Corp., Kennett Square, Pa.
Highway Safety Appliance Co., St. Paul 4, Minn.
Lintern Corp., Ashtabula, Ohio
Power Sander Inc., Minneapolis, Minn.
Sterling Tool Products Co., 362 E. Ohio St., Chicago, Ill.
Tarrant Mfg. Co., Saratoga Springs, N. Y.
Walter Motor Truck Co., Brooklyn, N. Y.
Westlake Mfg. Corp., Canastota, N. Y.

SASH, WINDOW

*Adams & Westlake Co., Elkhart, Ind.
*Edwards Co. O. M., Syracuse, N. Y.
Excel Corp., Elkhart, Ind.
General Seating Co., Topton, Pa.
Transportation Sash Co., Topton, Pa.
Visionator, Inc., Chicago 80, Ill.
Young Windows, Inc., Philadelphia 40, Pa.

SEALS and RINGS, OIL

Chicago Rawhide Mfg. Co., 1281 Elston Ave., Chicago, Ill.
Felt Products Mfg. Co., 1509 Carroll Ave., Chicago 7, Ill.
Fitzgerald Mfg. Co., Torrington, Conn.
National Motor Bearing Co., Redwood City, Calif.

SEATS

*American Seating Co., Grand Rapids, Mich.
Eckland Bros. Co., Minneapolis, Minn.
General Seating Co., Topton, Pa.
Hardman Mfg. Co., South Gate, Calif.
*Heywood-Wakefield Co., Gardner, Mass.
*Ionia Mfg. Co., Ionia, Mich.
McArthur Corp., Warren, 1 Park Ave., New York 16, N. Y.
National Seating Co., 624 S. Michigan Ave., Chicago 15, Ill.
*Sam Moore & Co., Mantua, Ohio

SEATS, SPRING or RUBBER CUSHIONS for

Armour Curled Hair Work., Div. Armour & Co., 1355 W. 31st St., Chicago, Ill.
Atkinson Spring Co., F. R., Hamburg, N. Y.
Blocksom & Co., Michigan City, Ind.
Burkhart Mfg. Co., F., St. Louis, Mo.
Dunlop Tire & Rubber Corp., Buffalo, N. Y.
Firestone Industrial Products Co., Akron, Ohio
*Goodyear Tire & Rubber Co., Akron 16, Ohio
Hewitt Rubber Corp., Buffalo, N. Y.
McInerney Spring & Wire Co., Grand Rapids, Mich.
Nukraft Mfg. Co., Shelbyville, Ind.
Owen Silent Spring Co., Bridgeport, Conn.
Royersford Spring Co., Royersford, Pa.
Sponge Rubber Products Co., Derby, Conn.
*U. S. Rubber Co., Mishawaka, Ind.
Woll & Co., F. P., Philadelphia, Pa.

SEATS, VALVE (Replacement)

*Albertson & Co., Sioux City, Iowa
Cedar Rapids Engrg. Co., Cedar Rapids, Iowa
Lee Co., K. O., Aberdeen, S. D.
Peterson Welding Laboratories, Kansas City 6, Mo.
Thompson Products, Inc., Cleveland 3, Ohio

SHAFTS, AXEL and PROPELLER

Automotive Gear Works, Richmond, Ind.
Brandt-Warner Mfg. Co., York, Pa.
Champ-Items, Inc., St. Louis, Mo.
Eaton Mfg. Co., Cleveland, Ohio
Foote Axle & Forge Co., Los Angeles 33, Calif.
Foreman Mfg. Co., 5353 S. State St., Chicago 9, Ill.
Lempco Products, Inc., Bedford, Ohio
Micro Test Gear Co., Indianapolis, Ind.
Morse Chain Co., Ithaca, N. Y.
Standard Forge & Axle Co., Montgomery, Ala.
*Timken-Detroit Axle Co., Detroit, Mich
U. S. Axle Co., Pottstown, Pa.

SHIMS, LAMINATED

Laminated Shim Co., Glenbrook, Conn.
National Motor Bearing Co., Redwood City, Calif.

SHOCK-ABSORBERS

*Delco Products Div., General Motors Corp., Dayton, Ohio
*Gabriel Co., Cleveland, Ohio
Houde Engineering Div., Houdaille-Hersey Corp., Buffalo, N. Y.
Monroe Auto Eqpt. Co., Monroe, Mich.
*National Pneumatic Co., 125 Amory St., Boston, Mass.
*National Transport Supply, Inc., 545 E. Hancock, Detroit 1, Mich.

SHUTTERS, RADIATOR

Brewer-Titchener Corp., Cortland, N. Y.
Cadillac Co., Coldwater, Mich.
Kysor Heater Co., Cadillac, Mich.

SIGNALS, DIRECTIONAL and STOP

American Automatic Devices Co., 520 S. Throop St., Chicago, Ill.
American Bosch Corp., Springfield, Mass.
Arrow Safety Device Co., Mt. Holly, N. J.
Auto Lamp Mfg. Co., 2909 Indiana Ave., Chicago 16, Ill.
Betts Mfg. Co., Warren, Pa.
Carpenter Mfg. Co., E. W., Bridgeport 1, Conn.
Carolina Metal Products, Inc., Charlotte, N. C.
Columbus Metal Prods. Co., Columbus, Ohio
Dietz Co., R. E., 225 Wilkinson St., Syracuse, N. Y.
Do-Ray Lamp Co., 1458 S. Michigan Ave., Chicago, Ill.
*Electric Auto-Lite Co., Toledo, Ohio
*Electric Service Mfg. Co., Philadelphia 32, Pa.
Griffin Lamp Co., Hamilton, Ohio.
*Guide Lamp Div., General Motors Corp., Anderson, Ind.
K-D Lamp Co., Cincinnati, Ohio
Marion Truck Eqpt. Co., 2030 S. State St., Chicago 16, Ill.
Protectal Motor Signal Co., Syracuse, N. Y.
Safety Turn Signal, 4659 N. Clark St., Chicago, Ill.
Signal-Stat Corp., Brooklyn, N. Y.
Sparks-Withington Co., Jackson, Mich.
Taylor Eng. Co., E. C., Tuckahoe, N. Y.
Yankee Metal Products Corp., Norwalk, Conn.

SIGNALS, FILL

Scully Signal Co., Cambridge 41, Mass.

SIGNALS, PASSENGER STOP

*Consolidated Metal Products Corp., Albany, N. Y.
*Delco-Remy Div. General Motors Corp., Anderson, Ind.
*Electric Service Mfg. Co., Philadelphia 32, Pa.
Faraday Electric Corp., Adrian, Mich.
Graybar Electric Co., 420 Lexington Ave., New York 17, N. Y. (Jobbers)
Jessall Plastic, Inc., Hartford, Conn.

SIGNALS, WARNING (Horns, Air and Electric Types)

American Bosch Corp., Springfield, Mass.
*Bendix-Westinghouse Automotive Air Brake Co., Elyria, Ohio
*Delco-Remy Div., General Motors Corp., Anderson, Ind.
*Electric Auto-Lite Co., Toledo, Ohio
*Electric Service Mfg. Co., Philadelphia, Pa.
Grover Products Co., Los Angeles 15, Calif.
Monroe Standard, Inc., Galion, Ohio
Sparks-Withington Co., Jackson, Mich.

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Box 2425
Raleigh, North Carolina

SIGNS, DESTINATION

*Electric Service Mfg. Co., Philadelphia 32, Pa.
Hunter Illuminated Car Sign Co., Flushing, N. Y.
Railway Utility Co., 2241 S. Indiana Ave., Chicago, Ill.

SOAP & DETERGENTS

Colgate-Palmolive-Peet Co., Jersey City, N. J.
Cudahy Packing Co., 221 N. La Salle St., Chicago, Ill.
Drew & Co., E. F., 15 E. 26th St., New York, N. Y.
Fine Organics, Inc., 211 E. 19th St., New York, N. Y.
Hollingshead Corp., R. M., Camden, N. J.
Kelite Products, Inc., Los Angeles 1, Calif.
Miller Mfg. Co., Camden, N. J.
Oronite Chemical Co., 38 Sansome St., San Francisco 4, Calif.
Procter & Gamble Co., Cincinnati, Ohio
Puritan Co., Rochester, N. Y.
Robertson Products Co., Thos. B., 700 W. Division St., Chicago, Ill.
Safety & Maintenance Co., 1 Wall St., New York, N. Y.
Stanley Co., John T., 624 West 30th St., New York 16, N. Y.
Turco Products, Inc., Los Angeles 1, Calif.

SOLDER

Allen & Co., L. B., 6727 W. Bryn Mawr Ave., Chicago, Ill.
American Smelting & Ref. Co., 120 Broadway, New York, N. Y.
Crown Aluminum Solder Co., 883 E. 134th St., New York, N. Y.
Gardiner Metal Co., 4843 S. Campbell Ave., Chicago 32, Ill.
Kester Solder Co., 4201 Wrightwood Ave., Chicago 39, Ill.
Lenk Mfg. Co., Newton Lower Falls, Mass.
Rocket Distributors, Inc., Bayside, L. I., N. Y.

SOLUTIONS, PARTS CLEANING

Brulin & Co., 2939 Columbia Ave., Indianapolis, Ind.
Curran Corp., Malden, Mass.
Detrex Corp., Detroit, Mich.
Fine Organics, Inc., 211 E. 19th St., New York, N. Y.
Ford Co., J. B., Wyandotte, Mich.
Fre-ese Products Co., Atlanta 3, Ga.
Geriach Co., E. A., Philadelphia 40, Pa.
Kelite Products, Inc., Los Angeles 1, Calif.
Lavo Co. of America, Milwaukee, Wis.
MacDermid, Inc., Waterbury, Conn.
*Magnus Chemical Co., Garwood, N. J.
Magnuson Prod. Corp., Brooklyn, N. Y.
*Oakite Products, Inc., 22 Thames St., New York 6, N. Y.
Pennsylvania Refining Co., Cleveland 4, Ohio
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Rust Master Chem. Co., Boston, Mass.
Safety & Maintenance Co., 1 Wall St., New York, N. Y.
Solventol Chem. Products, Inc., Detroit, Mich.
Stanley Co., J. T., 642 W. 30th St., New York 16, N. Y.
Turco Products, Inc., Los Angeles 1, Calif.
Wyandotte Chemicals Corp., Wyandotte, Mich.

SPARK PLUGS

*A. C. Spark Plug Div., General Motors Corp., Flint, Mich.
American Bosch Corp., Springfield, Mass.
Auburn Spark Plug Co., Auburn, N. Y.
*Bowers Battery & Spark Plug Co., Reading, Pa.
B. G. Corp., 136 W. 52nd St., New York, N. Y.
Blue Crown Spark Plug Co., 1800 W. Winnemac, Chicago, Ill.
*Champion Spark Plug Co., Toledo, Ohio
*Electric Auto-Lite Co., Toledo, Ohio
*Firestone Tire & Rubber Co., Akron, Ohio
Globe-Union, Inc., Milwaukee, Wis.
Hastings Mfg. Co., Hastings, Mich.
Jet Ignition Co., The, Larchmont, N. Y.

SPEEDOMETERS, ODOMETERS, TACHOMETERS

*A. C. Spark Plug Div., General Motors Corp., Flint, Mich.
Bendix Pioneer Instrument Co., Bendix, N. J.

Note—*More complete descriptions of this manufacturer's products appear in advertising pages of this or previous issues during the past year.

Corbin Screw Corp., New Britain, Conn.
Cramer & Co., R. W., Centerbrook, Conn.
*Electric Auto-Lite Co., Toledo, Ohio
Engler Instrument Co., 255 Culver Ave., Jersey City, N. J.
General Electric Co., Schenectady 5, N. Y.
Jones-Motrola, Stamford, Conn.
Knopf Instrument Co., Jersey City, N. J.
Stewart-Warner Corp., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Sun Electric Mfg. Co., Chicago, Ill.
Veeder-Root, Inc., Hartford 2, Conn.
*Wagner Electric Corp., St. Louis 14, Mo.
Weston Electrical Instrument Co., Newark 5, N. J.

SPRING, BUS (Leaf & Air)

Atkinson Spring Co., F. R., Hamburg, N. Y.
Eaton Mfg. Co., Cleveland, Ohio
Harvey Spring & Forging Co., Racine, Wis.
*General Tire & Rubber Co., The, Akron, Ohio (Air Spring)
Iron City Spring Co., Pittsburgh, Pa.
Laher Spring & Tire Corp., 2619 Magnolia St., Oakland, Calif.
Maremont Automotive Products, Inc., S. Ashland St., at 17th, Chicago, Ill.
Mather Spring Co., Toledo, Ohio
Merrill Spring Co., 530 W. 25th St., New York 1, N. Y.
Rowland, Inc., W. & H., Philadelphia, Pa.
St. Louis Spring Co., St. Louis, Mo.
Service Spring Co., Indianapolis, Ind.
Standard Steel Spring Co., Corapolis, Pa.
Trainor National Spring Co., New Castle, Ind.
Tuthill Spring Co., 760 W. Polk St., Chicago, Ill.
U. S. Spring & Bumper Co., Los Angeles 11, Calif.

STAMPINGS—See Panels

STENCILS

Dicks Co., C. O., Detroit, Mich.

SUPPLEMENTS, FUEL

Bell Laboratory, Inc., Orlando, Fla.
Wilco Co., 4425 Bandini Blvd., Los Angeles, Calif.

TANKS, AUXILIARY OIL

Walden, Inc., S. L., Philadelphia, Pa.

TAPE, MASKING

De Vilbiss Co., Toledo, Ohio
Eastman Kodak Co., Rochester, N. Y.
Permacel Tape Corp., New Brunswick, N. J.
Minnesota Mining & Mfg. Co., St. Paul 6, Minn.
Seamless Rubber Co., New Haven, Conn.
Technical Tape Corp., New York 53, N. Y.
Toplight Tape Co., York, Pa.
Van Cleef Bros., Inc., 7800 S. Woodlawn Ave., Chicago 19, Ill.

TERMINALS, BATTERY

David & Co., Inc., 881 Market, Paterson 2, N. J.

THERMOSTATS and CONTROLS

Bishop & Babcock Mfg. Co., Cleveland 14, Ohio
Bridgeport Thermostat Co., Bridgeport, Conn.
Dole Valve Co., 1901 Carroll Ave., Chicago, Ill.
*Evans Products Co., Detroit 27, Mich.
Fulton Syphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Harrison Radiator Div., General Motors Corp., Lockport, N. Y.
*Minneapolis-Honeywell Regulator Co., Minneapolis 8, Minn.
*Moto-Gard Co., Raleigh, N. C.
Mu Switch Corp., Canton, Mass.
Spencer Thermostat Co., Attleboro, Mass.
Standard Thompson Co., Vandalia, Ohio
*Vapor Heating Corp., 80 E. Jackson Blvd., Chicago 4, Ill.

TICKETS and TOKENS

General Ticket Co., Nashville, Tenn.
*Meyer & Wenthe, Inc., 30 South Jefferson St., Chicago 6, Ill.
Rand McNally & Co., 536 S. Clark St., Chicago, Ill.
Waterbury Cos., Inc., Waterbury, Conn.

TIRES and TUBES

Armstrong Rubber Co., West Haven, Conn.
Cooper Tire & Rubber Corp., Finlay, Ohio
Dayton Rubber Mfg. Co., Dayton, Ohio
Dunlop Tire & Rubber Co., Buffalo, N. Y.
*Firestone Tire & Rubber Co., Akron, Ohio
Fisk Rubber Co., Chicopee Falls, Mass.
*General Tire & Rubber Co., Akron, Ohio
*Goodyear Tire & Rubber Co., Akron, Ohio
*Goodrich Co., B. F., Akron, Ohio
Kelly-Springfield Tire Co., Cumberland, Md.
Laher Tire & Rubber Co., 2619 Magnolia St., Oakland, Calif.
Lee Tire & Rubber Co., Conshohocken, Pa.
Mansfield Tire & Rubber Co., Mansfield, Ohio
McCreary Tire Co., Indiana, Pa.
Mohawk Rubber Co., Akron, Ohio
Pennsylvania Rubber Co., Mansfield, Ohio
Polson Rubber Co., Garrettsville, Ohio
Seiberling Rubber Co., Barberton, Ohio
*U. S. Rubber Co., 1230 Sixth Ave., New York 20, N. Y.

TIRE CORD

*American Rayon Institute, 350 Fifth Ave., New York 1, N. Y.

TOILET & WASHROOM FACILITIES

*Colonna Angelo, Westmoreland & Boudinot Sts., Phila. 24, Pa.

TRANSMISSIONS—See Gears, Transmission

TRANSMISSION SERVICE—AUTOMATIC

*Trans-Main Corp, Kent, Ohio

TUBING, FLEXIBLE METALLIC

*Aeroquip Corp., Jackson, Mich.
American Metal Hose Branch, American Brass Co., Waterbury, Conn.
Belden Mfg. Co., Chicago, Ill.
Bendix-Eclipse, Teterboro, N. J.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Metal Hose Corp., 1315 S. Third Ave., Maywood, Ill.
Flex-O-Tube Co., Detroit 16, Mich.
Flexible Metal Hose Co., Chicago, Ill.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia 42, Pa.
Resistoflex Corp., Belleville, N. J.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Titeflex, Inc., Newark, N. Y.
Weatherhead Co., Cleveland 8, Ohio

TUBING, OIL and GASOLINE LINE and HYDRAULIC

*Aeroquip Corp., Jackson, Mich.
American Brass Co., Waterbury, Conn.
American Tube Bending Co., New Haven, Conn.
Bendix-Eclipse, Teterboro, N. J.
Chase Brass & Copper Co., Waterburg 91, Conn.
*DeVilbiss Spray Sys., Toledo, Ohio
Ilsco Copper Tube & Products Co., Cincinnati 27, Ohio
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill.
Parker Appliance Co., Cleveland, Ohio
Penn. Brass & Copper Co., Erie, Pa.
Resistoflex Corp., Belleville, N. J.

UNIFORMS, CAPS and BADGES

Abrahams & Co., Inc., S. Cadillac Bldg. Broad St. at Ridge Ave., Philadelphia 23, Pa.
Ben's Uniforms, 15492 Livernois Ave. Detroit 21, Mich.
Dubois & Son, A. 17 Union Square, New York, N. Y.
*Du Pont Co., Dept. 4B, Room 2522, Wilmington, Del.
Fechheimer Bros. & Co., 4th & Pike Sts., Cincinnati, Ohio.
Frankel & Son, Louis J., 407 El Picc Blvd., Los Angeles 15, Calif.
Gelhaar Uniform Co., 1230 Grand Ave. Kansas City 6, Mo.
Goldstein, Inc., Jeff, 387 Fourth Ave. New York, N. Y.
Hirsch Tyler Co., 10th & Berks Sts., Philadelphia, Pa.
Howard Uniform Co., 213 W. Baltimore St., Baltimore, Md.
Kansas City Custom Garment Co., Kansas City 6, Mo.
Lavigne, Inc., Donald S., 29 S. E. First Ave., Miami 32, Fla.
Loev Brothers, 2014 Kensington Ave., Philadelphia 24, Pa.
Magson Uniform Co., 270 New Britain, Rd., Kensington, Conn.
*Maier-Lavaty Co., Inc., 215 S. Peoria St., Chicago, Ill.
Master, The George, Ligonier, Ind.
Meier & Co., A. G., 205 W. Monroe St., Chicago, Ill.
*Metcalf Bros. & Co., Inc., 45 E. 17th St., New York, N. Y.
Penn Garment Co., 230 State St., Williamsport, Pa.
Peetibone Bros. Mfg. Co., 628 Sycamore St., Cincinnati 2, Ohio
Reed's Sons, Jacob, 1424 Chestnut St., Philadelphia, Pa.
Titeflex, Inc., Newark, N. J.
Weatherhead Co., Cleveland 8, Ohio
Reeves Bros., Inc., 54 Worth St., New York, N. Y.
Weiman & Sons, H. I., 1427-33 Vine St., Philadelphia, Pa.
Weintraub Bros. & Co. 1321 Noble St., Philadelphia 23 Pa.

UNIVERSALS—See Joints, Universal

UPHOLSTERY—See Fabrics—also Leather

VALVES, ENGINE

Automotive Products Corp., Cincinnati 25, Ohio
Eaton Mfg. Co., Cleveland, Ohio
King Quality Products Co., St. Louis, Mo.
McQuay-Norris Mfg. Co., St. Louis, Mo.
*Sealed Power Corp., Muskegon, Mich.
Thompson Products, Inc., Cleveland 3, Ohio
*Toledo Steel Products Co., Toledo 1, Ohio
Wilcox-Rich Div., Eaton Mfg. Co., Detroit, Mich.

VALVES, TIRE

Dill Mfg. Co., Cleveland 8, Ohio
Jenkins Bros., Inc., Bridgeport, Conn.
Lacey Webber, Kalamazoo, Mich.
*Schraeder's Son, A., Div. Scovill Mfg. Co., Brooklyn, N. Y.

VENDING—See Machines, Vending

VENTILATORS

Anemostat Corp. of Amer., 10 E. 39th St., New York, N. Y.
Cadillac Co., Coldwater, Mich.
*Electric Service Mfg. Co., Philadelphia 32, Pa.
*Evans Products Co., Detroit 27, Mich.
Garland Ventilator Co., 1511 E. Hyde Park, Chicago, Ill.
Kysor Heater Co., Cadillac, Mich.
Lintern, Inc., A. R., Detroit 27, Mich.
Railway Utility Co. 2241 S. Indiana Ave., Chicago, Ill.
Schwitzer-Cummings Corp., Indianapolis, Ind.
Sturtevant Div., Westinghouse Electric Corp., Boston, Mass.

WASTE and WIPING RAGS

Advance Packing & Supply Co., 618 W. Adams St., Chicago, Ill.
Mill Remnants Co., 91 Mercer St., New York, N. Y.
Sanitary Institute of America, 100 W. Monroe St., Chicago, Ill.

WHEELS

*Aluminum Co. of Amer., Pittsburgh, Pa.
*Budd Co., The, Detroit, Mich.
*Clark Equipment Co., Buchanan, Mich.
Dayton Steel Foundry Co., Dayton, Ohio
*Gunlite Foundries Corp., Rockford, Ill.
Kelsey-Hayes Wheel Co., Detroit, Mich.
Motor Wheel Corp., Lansing, Mich.
Permold Co., Medina, Ohio

WINDOWS—See Sash, Window

WIPERS, WINDSHIELD

Air Associates, Inc., Bendix, N. J.
American Bosch Corp., Springfield, Mass.
Anderson Co., Gary, Ind.
*Electric Auto-Lite Co., Toledo, Ohio
Hays Corp., Michigan City, Ind.
Monroe-Acme Co., 215 N. Aberdeen St., Chicago, Ill.
*National Pneumatic Co., Graybar Bldg., New York 17, N. Y.
*Sprague•Devices, C. A., Michigan City, Ind.
Trico Products Corp., Buffalo, N. Y.

SHOP EQUIPMENT

ANALYZERS, EXHAUST GAS

Allen Elec. & Equip. Co., Kalamazoo, Mich.
Bennett-Feragen, South Bend, Ind.
*Breeze Corps, Newark, N. J.
Cambridge Instrument Co., Grand Central Terminal, New York, N. Y.
Engelhard, Inc., Chas., Newark, N. J.
Gow-Mac Instrument Co., Newark, N. J.
King Elec. Co., Cleveland, Ohio
Moto Meter Gauge & Equipment Div.,
*Electric Auto-Lite Co., Chrysler Bldg., New York 17, N. Y.
Precision Industries, Inc., Seattle, Wash.
Weidenhoff, Inc., Jos., Ft. Wayne, Ind.

NOTE—*More complete descriptions of this manufacturer's products appear in advertising pages of this or previous issues during the past year.

BLOWERS, VENTILATING—See Fans and Blowers

BRUSHES, ROTARY WIRE

*Albertson & Co., Sioux City, Iowa
Osborn Mfg. Co., Cleveland, Ohio
Stow Mfg. Co., Binghamton, N. Y.
U. S. Electrical Tool Co., Cincinnati, Ohio
Van Norman Co., Springfield, Mass.

BRUSHES, WASHING

Beaurline Fountain Brush Co., 1243 S. Wabash Ave., Chicago, Ill.
*Electric Service Mfg. Co., Philadelphia 32, Pa.
Flour City Brush Co., Minneapolis, Minn.
Fuller Brush Co., Hartford, Conn.
Kansas City Brush Co., Kansas City, Mo.
Laitner Brush Co., Detroit 26, Mich.
Milwaukee Dustless Brush Co., Milwaukee, Wis.
Osborn Mfg. Co., Cleveland, Ohio
Pacific Coast Brush Co., Los Angeles 21, Calif.
Rapids Products Co., Cedar Rapids, Iowa
*Ross & White Co., 400 W. Madison, Chicago 6, Ill.
Thomas Fountain Brush Co., Nashville 6, Tenn.
Wilson Imperial Co., Newark, N. J.
Wolfe Brush Co., Pittsburgh, Pa.
Zimmerman Brush Works, Chicago 5, Ill.

CHARGERS, BATTERY

Allen Elec. & Equip. Co., Kalamazoo, Mich.
Baldor Electric Co., St. Louis 10, Mo.
Bean Mfg. Co., John, Lansing, Mich.
Benwood-Linze Co., St. Louis, Mo.
Electric Heat Control Co., Cleveland 5, Ohio
Electronic Laboratories, Inc., Indianapolis 4, Ind.
*Electric Storage Battery Co., Phila., Pa.
General Electric Co., Bridgeport, Conn.
Hobart Brothers, Troy, Ohio
Lanagan & Hoke, Philadelphia, Pa.
Lee Co., K. O., Aberdeen, S. D.
Marquette Mfg. Co., Minneapolis 14, Minn.
Mercury Corp., Kansas City, Mo.
Schauer Mfg. Co., Rossmoyne, Ohio
Weidenhoff, Inc., Jos., Ft. Wayne, Ind.
*Willard Storage Battery Co., Cleveland 1, Ohio

CLEANERS, STEAM and AIR

Aeroil Prod. Co., South Hackensack, N. J.
Circo Eqpt. Co., Clark Twshp., N. J.
Clayton Mfg. Co., Rosemead, Calif.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Kelite Products, Inc., Los Angeles, Calif.
Livingstone Engineering Co., Worcester, Mass.
*Magnus Chemical Co., Garwood, N. J.
*Oakite Products, Inc., 32 Thames, New York, N. Y.
*Storm-Vulcan, Inc., 2225 Burbank, Dallas, Texas
Turco Products, Inc., Los Angeles, Calif.
*Vapor Heating Corp., Railway Exchange Bldg., Chicago, Ill.

CLEANERS, VACUUM & POWER

Black & Decker Mfg. Co., Towson, Md.
Breuer Electric Mfg. Co., 5100 N. Ravenswood Ave., Chicago 50, Ill.
Clements Mfg. Co., 6650 S. Narragansett, Chicago 38, Ill.
General Electric Co., Bridgeport, Conn.
Hardie Mfg. Co., Hudson, Mich.
Invincible Vacuum Cleaner Mfg. Co., Dover, Ohio
Rapid Sales Corp., 3521 Lake St., Melrose Park, Ill.
Rexair, Inc., Detroit, Mich.
*Ross & White Co., 400 W. Madison, Chicago 6, Ill.
Spencer Turbine Co., Hartford 6, Conn.
Sturtevant Div., Westinghouse Elec Corp., Boston 36, Mass.
Von Schraeder Mfg. Co., Racine, Wis.
Whiting Corp., Harvey, Ill.

COMPRESSORS, AIR

*American Chain & Cable Co., Detroit 2, Mich.
Baker-Air Equipment Co., Alameda, Calif.
Bean Mfg. Co., John, Lansing, Mich.
Binks Mfg. Co., 3124 Carroll Ave., Chicago, Ill.
Brunner Mfg. Co., Utica 1, N. Y.
Champion Pneumatic Machy. Co., Princeton, Ill.
Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y.
Curtis Pneumatic Mchy., Div. Curtis Mfg. Co., St. Louis 20, Mo.
De Vilbiss Co., Toledo 1, Ohio
Hardie Mfg. Co., Hudson, Mich.
Imperial-Cantrell Mfg. Co., Jellico, Tenn.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Kellogg Div. American Brake Shoe & Fdy. Co., Rochester, N. Y.
Lynch Air Compressor Co., Anderson, Ind.
*Midland Steel Products Co., Detroit, Mich.
Quincy Compressor Co., Quincy, Ill.
U. S. Air Compressor Co., Cleveland 5, Ohio
Wayne Pump Co., Salisbury, Md.
*Weaver Mfg. Co., Springfield, Ill.
*Westinghouse Air Brake Co., Wilmerding, Pa.
Worthington Pump & Machy. Corp., Harrison, N. J.

CRANES and CHAIN HOISTS

Canton Div., Hill Acme Co., Cleveland, Ohio
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.
David Round & Son, Cleveland 22, Ohio
*Electric Service Mfg. Co., Philadelphia 32, Pa.
Electro Lift, Inc., 30 Church St., New York 7, N. Y.
Kent-Moore Organization, Detroit, Mich.
Robbins & Meyers Co., Anderson, Ind.
Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y.
Silent Hoist & Crane Co., Brooklyn 20, N. Y.
*Weaver Mfg. Co., Springfield, Ill.
Wright Mfg. Div., American Chain & Cable Co., York, Pa.
Yale & Towne Mfg. Co., Philadelphia 24, Pa.

DOORS, GARAGE and SHOP (Automatic Opening Equipment)

Barber-Coleman Co., Rockford, Ill.
*Kinnear Mfg. Co., Columbus 16, Ohio.
Overhead Door Co., Cortland, N. Y.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Truscon Steel Co., Youngstown 1, Ohio

DRILLS, ELECTRIC

*Albertson & Co., Sioux City, Iowa
Black & Decker Mfg. Co., Towson, Md.
Cummins Portable Tools, 4740 N. Ravenswood Ave., Chicago 40, Ill.
Ingersoll-Rand Co., 11 Broadway, New York, N. Y.
Mall Tool Co., 7737 S. Chicago Ave., Chicago 19, Ill.
Millers Falls Co., Greenfield, Mass.
Skil Corp., 5031 Elston Ave., Chicago 30, Ill.
*Snap-On Tools Corp., Kenosha, Wis.
Stanley Tools, New Britain, Conn.
Thor Power Tool Co., Aurora, Ill.
U. S. Electrical Tool Co., Cincinnati, Ohio
Van Dorn Elec. Tool Co., Towson, Md.

DYNAMOMETERS, ENGINE TESTING

Chatillon & Sons, John, 85 Cliff St., New York 7, N. Y.
Clayton Mfg. Co., 1362 Ellis Lane, El Monte, Calif.
Taylor Dynamometer Co., Milwaukee, Wis.
Toledo Scale Co., Telegraph Rd., Toledo 12, Ohio

FANS and BLOWERS, VENTILATING and EXHAUST

Buffalo Forge Co., Buffalo, N. Y.
De Vilbiss Co., Toledo 1, Ohio
General Blower Co., Morton Grove, Ill.
Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago 41, Ill.
National System of Garage Ventilation, Decatur, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sturtevant Div., Westinghouse Elec. Corp., Boston 36, Mass.
Wing Mfg. Co., L. J., Linden, N. J.

FIXTURES, ALIGNING (Piston Pin, Rod)

Automotive Maintenance Mchy Co., 2100 Commonwealth Ave., Chicago, Ill.
Storm Mfg. Co., Minneapolis, Minn.
Sunnen Products Co., St. Louis, Mo.
Taft-Pierce Mfg. Co., Woonsocket, R. I.

FLUSHERS, RADIATOR CLEANING

Choldum Mfg. Co., New Haven, Conn.
Hoyt-Beardsley Mfg. Co., Sioux City, Iowa
Trowbridge Auto Radiator Co., Cambridge, N. J.

GAGES, TIRE

Acme Air Appliance Co., Brooklyn, N. Y.
Barmotive Products, Inc., San Leandro, Calif.
Brunner Mfg. Co., Utica 1, N. Y.
Dill Mfg. Co., Cleveland 3, Ohio
Druge Bros. Mfg. Co., Oakland, Calif.
*Schrader's Son, A., Div. Scovill Mfg. Co., Brooklyn, N. Y.
Service Equipment Co., South Gate, Calif.
Service Station Eqpt. Co., Muskegon, Mich.
Stewart-Warner Corp., Chicago, Ill.
U. S. Gage Co., 14 Wall St., New York 5, N. Y.

GAGES, WHEEL ALIGNING

Bear Mfg. Co., Rock Island, Ill.
Bee Line Co., Davenport, Iowa
Bennett Feragen, Inc., South Bend, Ind.
Duby Co., John F., Dorchester, Mass.
Hunter Engrg. Co., St. Louis, Mo.
Lee Co., K. O., Aberdeen, S. D.
Manbee Equipment Co., 185 N. Wabash, Chicago, Ill.
Motor Wheel Corp., Lansing, Mich.
*Snap-On Tools Corp., Kenosha, Wis.
Speedmaster Co., Des Plaines, Ill.
Testing Apparatus, Inc., Detroit, Mich.
*Weaver Mfg. Co., Springfield, Ill.

GAGES and MICROMETERS

Ames Co., B. C., Waltham, Mass.
Brown & Sharpe Mfg. Co., Providence, R. I.
Central Tool Co., Cranston, R. I.
Federal Products Corp., Providence, R. I.
Millers Falls Co., Greenfield, Mass.
Plomb Tool Co., Los Angeles 54, Calif.
Pratt & Whitney, Div. Niles-Bement-Pond Co., Hartford, Conn.
Slocomb Co., J. T., Providence, R. I.
*Snap-On Tools Corp., Kenosha, Wis.
Starrett Co., L. S., Athol, Mass.
Stewart-Warner Corp., Chicago 14, Ill.

GRINDERS, BENCH and PEDESTAL

*Albertson & Co., Sioux City, Iowa
American Hydraulics, Inc., Sheboygan, Wis.
Baldor Electric Co., St. Louis 10, Mo.
Black & Decker Mfg. Co., Townson, Md.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Cedar Rapids Engrg. Co., Cedar Rapids, Iowa
Cincinnati Electrical Tool Co., Cincinnati, Ohio
Lee Co., K. O., Aberdeen, S. D.
Lempco Products, Inc., Bedford, Ohio
Millers Falls Co., Greenfield, Mass.
Peterson Welding Labs., Kansas City, Mo.
Simplicity Mfg. Co., Port Washington, Wis.
Skil Corp., 5031 Elston Ave., Chicago 30, Ill.
*Snap-On Tools Corp., Kenosha, Wis.
Stanley Tools, New Britain, Conn.
Sunnen Products Co., St. Louis, Mo.
Tobin-Arp Mfg. Co., Minneapolis, Minn.
U. S. Electrical Tool Co., Cincinnati, Ohio
Van Dorn Elec. Tool Co., Towson, Md.
Van Norman Co., Springfield 7, Mass.
Weidenhoff, Inc., Joseph, Ft. Wayne, Ind.

GRINDERS, CRANKSHAFT

Heald Machine Co., Worcester, Mass.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester 6, Mass.
Tobin-Arp Mfg. Co., Minneapolis, Minn.
Van Norman Co., Springfield 7, Mass.
Waterbury Tool Div., Vickers, Inc., Waterbury, Conn.

GRINDERS and HONES, CYLINDER RECONDITIONING

*Albertson & Co., Sioux City, Iowa
Automotive Maintenance Mchy. Co., 2100 Commonwealth Ave., N. Chicago, Ill.
Cedar Rapids Engrg. Co., Cedar Rapids, Iowa
Landis Tool Co., Waynesboro, Pa.
Lempco Products, Inc., Bedford, Ohio
Rottler Boring Bar Co., Seattle, Wash.
Simplicity Mfg. Co., Port Washington, Wis.
Storm Mfg. Co., Minneapolis, Minn.
Sunnen Products Co., St. Louis, Mo.
Tobin-Arp Mfg. Co., Minneapolis, Minn.
Van Norman Co., Springfield, Mass.
Waterbury Tool Div., Vickers, Inc., Waterbury, Conn.

GRINDERS, PISTON

Cedar Rapids Engrg. Co., Cedar Rapids, Iowa
Rottler Boring Bar Co., Seattle, Wash.
Storm Mfg. Co., Minneapolis, Minn.
Van Norman Co., Springfield 7, Mass.

GRINDERS, VALVE (Refacing and Seating)

*Albertson & Co., Sioux City, Iowa
Black & Decker Mfg. Co., Townson, Md.
Cedar Rapids Engrg. Co., Cedar Rapids, Iowa
Evans Reamer & Mach. Co., 4541 N. Ravenswood Ave., Chicago, Ill.

NOTE—*More complete descriptions of this manufacturer's products appear in advertising pages of this or previous issues during the past year.

Kent-Moore Organization, Detroit, Mich.
Landis Tool Co., Waynesboro, Pa.
Lee Co., K. O., Aberdeen, S. D.
Lisle Corp., Clarinda, Iowa
Simplicity Mfg. Co., Port Washington, Wis.
*Snap-On Tools Corp., Kenosha, Wis.
Sunnen Products Co., St. Louis, Mo.
Van Dorn Electric Tool Co., Towson, Md.
Van Norman Co., Springfield 7, Mass.
Waterbury Tool Div., Vickers, Inc., Waterbury, Conn.

GUNS, PAINT SPRAY—See Sprayers, Paint

GUNS, SAND BLAST

Roesch & Co., C. A., Los Angeles, Calif.
Vacu-Blast Co., Inc., Belmont, Calif.

GUNS, TANKS and LUBRICATORS, GREASING

Aro Equipment Corp., Dayton, Ohio
Balcrank, Inc., Cincinnati, Ohio
Brown-Dynalube Co., Charlotte, N. C.
Gray Co., Minneapolis, Minn.
Grover Smith Mfg. Co., San Gabriel, Calif.
*Hollingshead Corp., R. M., Camden, N. J.
Lubrication Machy. Corp. of America, Newark, N. J.
*Lincoln Engrg. Co., St. Louis, Mo.
Smith-Johnson Co., Los Angeles 21, Calif.
Stewart-Warner Co., 1828 W. Diversey Pkwy., Chicago 14, Ill.
*Weaver Mfg. Co., Springfield, Ill.

HEATERS, GARAGE UNIT

R. D. Fageol Co., Detroit 11, Mich.
Grinnell Co., Providence 1, R. I.
Modine Mfg. Co., Racine, Wis.
Sturtevant Div., Westinghouse Elec Corp., Boston 36, Mass.
Unit Heater & Cooler Co., Wausau, Wis.
Wing Mfg. Co., L. J., Linden, N. J.

HEATERS, HOT SPRAY—See Sprayers, Hot Paint

HEATERS, PARKING LOT

Vapor Heating Corp., 80 E. Jackson Blvd., Chicago 4, Ill.

HOISTS—See Cranes and Hoists—also Lifts

HORSES, ADJUSTABLE STEEL

Bassick Co., Bridgeport, Conn.
Kent-Moore Organization, Detroit, Mich.
Manley Mfg., Div., American Chain Co., York, Pa.
Walker Mfg. Co., Racine, Wis.

INSTRUMENTS, DIESEL TESTING — See Testers, Diesel

INSTRUMENTS, ELECTRICAL TESTING

Allen Electric & Equip. Co., Kalamazoo, Mich.
Auto Test Co., 600 S. Michigan, Chicago, Ill.
*Electric Auto-Lite Co., Auto Wire & Cable Div., Toledo, Ohio
General Electric Co., Schenectady 5, N. Y.
Ideal Industries, Inc., Sycamore, Ill.
King Elec. Co., Cleveland, Ohio
Lanagan & Hoke, Philadelphia, Pa.
Sun Elec. Mfg. Co., Chicago, Ill.
Weidenhoff, Inc., Joseph, Ft. Wayne, Ind.
Westinghouse Elec. Corp., Pittsburgh, Pa.

JACKS, FLOOR and HAND

Airquiment Co., Burbank, Cal.
Auto Specialties Mfg. Co., St. Joseph, Mich.
Ajax Auto Parts Co., Racine, Wis.
*Bacharach Indust'l Inst. Co., Pittsburgh 8, Pa.
Bay Mfg. Co., P.O. Box 578, Torrance, Calif.
*Blackhawk Mfg. Co., Milwaukee 1, Wis.
Buda Co., Harvey, Ill.
Chatsworth Mfg. Co., Chatsworth, Ga.
Cleveland Pneumatic Tool Co., Cleveland 5, Ohio
Coffing Hoist Co., Danville, Ill.
Duff Norton Mfg. Co., Pittsburgh, Pa.
*Electric Service Mfg. Co., Philadelphia 32, Pa.
Hein-Werner Motor Parts Corp., Waukesha, Wis.
Homestead Valve Co., Coraopolis, Pa.
Joyce-Cridland Co., Dayton, Ohio
Manley Mfg. Div., American Chain Co., York, Pa.
Menasco Mfg. Co., Burbank, Cal.
National Standard Co., Niles, Mich.
Phelps Mfg. Co., Van Nuys, Calif.
Reliable Jack Div., Dayton Malleable Iron Co., Dayton 1, Ohio
Templeton, Kenly & Co., 1020 S. Central Ave., Chicago 44, Ill.
Walker Mfg. Co., Racine, Wis.
*Weaver Mfg. Co., Springfield, Ill.

LATHES

Axelson Mfg. Co., Los Angeles 11, Calif.
Barnes Co., W. P. & John, Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence, R. I.
Hendly Machine Co., Torrington, Conn.
LeBlond Machine Tool Co., R. K. Cincinnati, Ohio
Rockford Machine Tool Co., Rockford, Ill.
Sheldon Machine Co., 4229 N. Knox Ave., Chicago, Ill.
South Bend Lathe Works, South Bend, Ind.

LATHES and GRINDERS, BRAKE DRUM

U. S. Electrical Tool Co., Cincinnati, Ohio
Bean Mfg. Co., John, Lansing, Mich.
Chicago Rivet & Machine Co., Bellwood
Barrett Equipment Co., St. Louis, Mo.
Van Dorn Elec. Tool Co., Towson, Md.
Ill.
Strand & Co., N. A., 5001 N. Wolcott, Chicago, Ill.
Lempco Products, Inc., Bedford, Ohio.
South Bend Lathe Wks., South Bend, Ind
Van Norman Co., Springfield, Mass.
Wadell Equipment Co., Garwood, N. J.
Waterbury Tool Div., Vickers, Inc., Waterbury, Conn.

LIFTS or HOISTS, BUS

Bay Mfg. Co., P. O. Box 608, Harbor City, Calif.
Curtis Pneumatic Mchy., Div., Curtis Mfg. Co., St. Louis 20, Mo.
Globe Hoist Co., Philadelphia 18, Pa.
Joyce-Cridland Co., Dayton 3, Ohio
Manley Mfg. Div., American Chain Co., York, Pa.
Rotary Lift Co., Memphis, Tenn.
Walker Mfg. Co., Racine, Wis.
*Weaver Mfg. Co., Springfield, Mass.
Whiting Corp., Harvey, Ill.

NOTE—*More complete descriptions of this manufacturer's products appear in advertising pages of this or previous issues during the past year.

PROTECT REVENUE with Allocated* METAL FARE TOKENS

CHICAGO TRANSIT AUTHORITY

Ideal for multi-fare and fractional fare systems. Attract riders. Speed fare handling. Eliminate change-making delays. Assure accurate sorting, counting and wrapping by maintenance of identical size. An investment . . . not an expense, for they wear indefinitely.

* Allocated . . . an exclusive M & W method of manufacturing metal fare tokens individually designed for each customer. Perforations and lettering are in the same relative aligned position on every token which makes them identical, thus protecting against duplication. This is especially important with no Federal law protection.

Established 1854

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MEYER & WENTHE, Inc.

30 S. Jefferson St., Chicago 6, Ill.

REBUILDING

WAKE UP!

Cut your armature maintenance costs and increase your mileage on bus armatures . . .
. . . that is what we have done for a lot of bus operators.

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Our convenient money-saving and time-saving armature maintenance service is used by large and small bus operators from coast to coast.

They save money! *Why don't you?*

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AUTOMOTIVE GENERATOR SERVICE

"House of Bus Armatures"
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E. J. FUSCH, President
St. Louis 7, Missouri

STOLEN FARES?

By operators "knocking down" or by passengers "stealing rides." Practical Perey Turnstile Systems efficiently get more fares.

Install PEREY TURNSTILES

106 EAST 41st ST., NEW YORK 17, N. Y.

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$12.50 per year, 12 issues—

Published by

RUSSELL'S GUIDES, INC.

Cedar Rapids, Iowa

BOWERS BATTERIES

Always Better

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BUS SEATS

New for replacements or your old ones re-covered. Your seating problems solved at a great savings.

Call or write for further details and prices. All work guaranteed.

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FABRIC CLEANER 3¢ gal

A mild detergent shipped in highly concentrated form. Simply add water to clean all transportation grade fabrics, leather and floor coverings. Quick, easy, effective. Write for sample of Happroc NCCC. Very oily concrete floors need Happroc HD Cleaner. Haynes Products Co., 4007 Farnam St., Omaha 3, Nebraska.

LOCKERS—See Shelving, Parts Bins, Etc.

MACHINES, SANDING and POLISHING

*Albertson & Co., Sioux City, Iowa
Black & Decker Mfg. Co., Towson, Md.
Carborundum Co., Niagara Falls, N. Y.
Detroit Surfacing Mach. Co., Detroit 4, Mich.
Haskins Co., R. G., 2750 W. Flournoy St., Chicago 12, Ill.
Mall Tool Co., 7740 S. Chicago Ave., Chicago 19, Ill.
Pratt & Whitney, Div. Niles-Bement-Pond Co., Hartford, Conn.
*Snap-On Tools Corp., Kenosha, Wis.
Skil Corp., 5021 Elston Ave., Chicago 30, Ill.

MACHINES, WHEEL ALIGNING — See GAGES, WHEEL ALIGNING

MACHINES, WHEEL BALANCING

Bean Mfg. Co., John, 1305 S. Cedar St., Lansing, Mich.
Bear Mfg. Co., 21st St. & Fifth Ave., Rock Island, Ill.
Bee-Line Co., Box 569, Davenport, Iowa
Bennett-Feragen, South Bend, Ind.
Bull's Eye Wheel Balancing Co., 232 Mayo Bldg., Tulsa, Okla.
Hunter Engrg. Co., St. Louis, Mo.
Stewart-Warner Corp., 1826 Diversey Parkway, Chicago, Ill.
Sunstrand Tool Co., Rockford, Ill.
*Weaver Mfg. Co., 2177 S. Ninth St., Springfield, Ill.

MICROMETERS—See Gages and Micrometers

PARTS-WASHING, EQUIPMENT for

Aeroil Prod. Co., South Hackensack, N. J.
Blakeslee & Co., G. S., 1844 S. 52nd St., Chicago 50, Ill.
Circo Eqpt. Co., Clark Twshp., N. J.
Clayton Mfg. Co., (Kerrick), Alhambra, Calif.
Detrex Corp., Detroit, Mich.
Grinnell Co., Providence 1, R. I.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Gray-Mills Co., Evanston, Ill.
Hydra Lectric Prod. Co., Indianapolis, Ind.
Livingstone Engr. Co., 100 Grove St., Worcester, Mass.
*Magnus Chemical Co., Garwood, N. J.
*Oakite Products, Inc., 22E Thames St., New York 6, N. Y.
Practical Products Co., Minneapolis 8, Minn.
Roth Mfg. Co., 1600 S. Kilbourn Ave., Chicago, Ill.
Siebring Mfg. Co., George, Iowa
Tivit Products Co., Torrance, Calif.
Whiting Corp., Harvey, Ill.

PRESSES, ARBOR

A. B. C. Products, Los Angeles, Calif.
Greenerd Arbor Press Co., Nashua, N. H.
Lempco Products, Inc., Bedford, Ohio
Manley Mfg. Div., American Chain Co., York, Pa.
*Weaver Mfg. Co., Springfield, Ill.

PULLERS, WHEEL and GEAR

*Bacharach Indust'l Inst. Co., Pittsburgh 8, Pa.
Bear Mfg. Co., Rock Island, Ill.
Cole-Hersee Co., Boston, Mass.
Crane Puller Co., Waltham, Mass.
Greb Co., Stoughton, Mass.
National Machine & Tool Co., 4077 Page St., Jackson, Mich.
*Snap-On Tools Corp., Kenosha, Wis.
Sweeney Mfg. Co., B. K., Denver, Colo.
U. S. Axle Co., Pottstown, Pa.

PUMPS and TANKS, GAS and OIL, STORAGE and DISPENSING

Acme Pump & Tank Corp., 521 Fifth Ave., New York 17, N. Y.
Aqua Systems, Inc., 385 Gerard Ave., New York 51, N. Y.
Bowser, Inc., Fort Wayne 2, Ind.
Erie Meter Systems, Inc., Erie, Pa.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Liquidometer Corp., Long Island City, N. Y.
Neptune Meter Co., 50 W. 50th St., New York 20, N. Y.
Service Station Equipment Co., Muskegon, Mich.
Sharpsville Steel Fabricators, Inc., Sharpsville, Pa.
Tokheim Oil Tank & Pump Co., Fort Wayne, Ind.
Wayne Pump Co., Salisbury, Md.
Yale & Towne Mfg. Co., Stamford, Conn.

REAMERS—See Taps, Dies, Reamers, Etc.

RECLAIMERS and RECTIFIERS, OIL

Hilliard Corp., Elmira, N. Y.
*Luber-Finer, Inc., Los Angeles 7, Calif.
Oil Purifier, Inc., Oakland, Calif.
Skinner Purifiers, Inc., Detroit, Mich.
Youngstown Miller Co., Bellville, N. J.

RECTIFIERS, BATTERY CHARGING — See Charges, Battery

RECTIFIERS, OIL—See Reclaimers and Rectifiers, Oil

REGROOVERS, TIRE

*Bendix Products, Div. Bendix Aviation Corp., South Bend, Ind.
Kent-Moore Organization, Detroit, Mich.
Shaler Co., Waupun, Wis.
Stackhouse, E. H., Philadelphia, Pa.
Vanderbilt-Osborne Corp., Newark, N. J.

SANDERS—See Machines, Sanding and Polishing

SHAFTING, FLEXIBLE

Strand & Co., N. A., 5001 N. Wolcott St., Chicago 40, Ill.

SHELVING, PARTS BINS, TOOL STANDS, BENCHES, LOCKERS, ETC.

Ainsworth Mfg. Corp., Detroit 7, Mich.
American Locker Co., Boston, Mass.
Aurora Steel Products Co., Aurora, Ill.
Berger Div., Republic Steel Corp., Canton, Ohio
Darby & Son, E. J., Philadelphia, Pa.
*Electric Service Mfg. Co., Philadelphia 32, Pa.
Hall Co., Gordon L., Old Lynne, Conn.
Lyon Metal Products, Inc., Aurora, Ill.
National Scale Co., Chicopee Falls, Mass.
Penn Metal Corp., Philadelphia, Pa.
*Snap-On Tools Corp., Kenosha, Wis.
Standard Pressed Steel Co., Jenkintown, Pa.
Stackbin Corp., Olneyville, R. I.
Superior Mfg. Co., Winston-Salem, N. C.

SPRAYERS, METAL COATING

Bede Industrial Products Inc., Cleveland Ohio
Metals Coating of America, Philadelphia, Pa.
Metallizing Engineering Co., Long Island City, N. Y.
Metallizing Co. of America, 1330 W. Congress St., Chicago, Ill.

SPRAYERS, PAINT

Binks Mfg. Co., 3124 W. Carroll Ave., Chicago, Ill.
Black Mfg. Co., Baltimore, Md.
Brunner Mfg. Co., Utica 1, N. Y.
Crown Spray Gun Mfg. Co., Los Angeles, Calif.
Curtis Pneumatic Mchy., Div. Curtis Mfg. Co., St. Louis 20, Mo.
Decora Mfg. Co., Berkeley, Calif.
DeVilbiss Co., Toledo 1, Ohio
Eclipse Air Brush Co., Newark, N. J.
Electric Sprayit Co., Sheboygan, Wis.
Kellogg Div., American Brake Shoe & Fdry. Co., Rochester, N. Y.
Master Mfg. Co., 811 W. Cabrini St., Chicago 7, Ill.
Metal Specialties Mfg. Co., 3200 W. Carroll Ave., Chicago, Ill.
Paasche Airbrush Co., 1909 W. Diversey Pkwy., Chicago 14, Ill.
Spray Engineering Co., Somerville, Mass.

SPRAYERS, HOT PAINT

Spee-Flo Co., The, 3603 Harrisburg Blvd., Houston, Texas
Thermalcup, Inc., Cleveland, Ohio

STANDS, AXLE REPAIR

*Bacharach Indust'l Inst. Co., Pittsburgh 8, Pa.
Continental Sales Corp., Columbus, Ind.
Kent-Moore Organization, Detroit, Mich.
*Weaver Mfg. Co., Springfield, Ill.

STANDS, JIGS and FIXTURES, ENGINE REPAIR

*Bacharach Indust'l Inst. Co., Pittsburgh 8, Pa.
Clayborne Mfg. Co., 4541 W. Lake St., Chicago, Ill.
Continental Mfg. Co., Columbus, Ind.
*Ebersol Mach. & Tool Corp., Pottstown, Pa.
Kent-Moore Organization, Detroit, Mich.
Latch Engrg. Co., Chester, Pa.
*Weaver Mfg. Co., Springfield, Ill.

STANDS, TOOL—See Shelving, Parts Bins

STANDS, TRANSMISSION and DIFFERENTIAL, REPAIR

*Bacharach Indust'l Inst. Co., Pittsburgh 8, Pa.
Bennett, Feragen, Inc., South Bend, Ind.
Ebersol Mach. & Tool Corp., Pottstown, Pa.
Kent-Moore Organization, Detroit, Mich.
Manley Mfg., Div. American Chain Co., York, Pa.

TANKS, GREASING—See Guns and Tanks Greasing

TANKS, OIL and GREASE—See Pumps and Tanks, Oil and Grease

TAPS, DIES, REAMERS, Etc.

Alvord-Polk Tool Co., Millersburg, Pa.
Automotive Maint. Mach. Co., 2100 Commonwealth Ave., N. Chicago, Ill.
C. & W. Tool Co., Cambridge, Mass.
Cleveland Twist Drill Co., Cleveland, Ohio
Foster-Johnson Reamer Co., Elkhart, Ind.
Greenfield Tap & Die Corp., Greenfield, Mass.
Keystone Reamer & Tool Co., Millersburg, Pa.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Reiff & Nestor Co., Lykens, Pa.
Ridge Tool Co., Elyria, Ohio
*Snap-On Tools Corp., Kenosha, Wis.
Watervliet Tool Co., Albany, N. Y.
Wayne Tool Co., Waynesboro, Pa

TESTERS, BRAKE

Bean Mfg. Co., John, Lansing, Mich.
Bear Mfg. Co., Rock Island, Ill.
Bennett-Feragen, Inc., South Bend, Ind.
Brakemaster Corp., Chicago 50, Ill.
Muther Mfg. Co., Boston, Mass.
*Weaver Mfg. Co., Springfield, Ill.

TESTERS & TOOLS, DIESEL FUEL SYSTEMS

*Bacharach Industrial Instrument Co., Pittsburgh 8, Pa.
Buda Co., Harvey, Ill.
Ebersol Mach. & Tool Corp., Pottstown, Pa.
Hein-Werner Motor Parts Corp., Waukesha, Wis.
Kent Moore Org., Detroit, Mich.

TESTERS, DIESEL—Compression, Smoke, Fuel Pump, Nozzles — See Testers, Diesel Fuel Systems

TESTERS, EXHAUST GAS—See Analyzers, Exhaust Gas

TOOLS, BEARING

Automotive Maintenance Mchy. Co., 2100 Commonwealth Ave., N. Chicago, Ill.
Freeport Machine Wks., Freeport, Ill.
Kent-Moore Organization, Detroit, Mich.
Landis Tool, Inc., Waynesboro, Pa.
Lempco Products, Inc., Bedford, Ohio
Taft-Pierce Mfg. Co., Woonsocket, R. I.
Tobin-Arp Mfg. Co., Minneapolis 15, Minn.

TOOLS, HAND and SPECIAL PURPOSE

*Albertson & Co., Sioux City, Iowa
All Power Co., 202 Roosevelt Ave., Montebello, Calif.
*Bacharach Indust'l Inst. Co., Pittsburgh 8, Pa.
Black & Decker Mfg. Co., Towson, Md.
*Blackhawk Mfg. Co., Milwaukee 1, Wis.
Bonney Forge & Tool Works, Allentown, Pa.
Eclipse Air Brush Co., Newark, N. J.
Duro Metal Products Co., Chicago, Ill.
Ebersol Mach. & Tool Corp., Pottstown, Pa.
Everhot Mfg. Co., Maywood, Ill.
Fairmount Tool & Forging Co., Cleveland, Ohio
Fostoria Pressed Steel Corp., Fostoria, Ohio
Herbrand Corp., Fremont, Ohio
Indestro Mfg. Co., Chicago, Ill.
Ingersoll Rand Co., 11 Broadway, New York, N. Y.
Ken-Tool Mfg. Co., Akron, Ohio
K-D Mfg. Co., Lancaster, Pa.
Lee Co., K. O., Aberdeen, S. D.
Mall Tool Co., 7740 S. Chicago Ave., Chicago, Ill.
New Britain Mach. Co., New Britain, Conn.
Owatonna Tool Co., Owatonna, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
*P & G Mfg. Co., 305 N.E. Russell St., Portland 12, Oregon
Porto Knurling Tools Inc., Chicago, Ill.
Porter, Inc., H. K. Everett 4w, Mass.
Proto Tools, Los Angeles 54, Calif.
*Richmont Inc., 922 S. Myrtle Ave., Monrovia, Calif.
Rinck & McIlwaine, Inc., 16 Hudson St., New York, N. Y.
Robinson Products, Inc., Detroit 21, Mich.
*Snap-On Tools Corp., Kenosha, Wis.
Stanley Tools, New Britain, Conn.
Swallow Airplane Co., Wichita, Kan.
Tubing Appliance Co., 10321 Anza Ave., Los Angeles 45, Calif.
Van Dorn Electric Tool Co., Towson, Md.
*Weaver Mfg. Co., Springfield, Ill.
Williams Co., J. H., Buffalo 7, N. Y.

TOOLS, PNEUMATIC

Chicago Pneumatic Tool Co., E. 44th St., New York 17, N. Y.
Cummins Portable Tools, 4740 N. Ravenswood Ave., Chicago 40, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Keller Tool Co., Grand Haven, Mich.
Skil Corp., 5033 Elston Ave., Chicago 30, Ill.
Thor Power Tool Co., Aurora, Ill.
U. S. Tool Co., Ampere, N. J.

TRUCKS, HAND LIFT

*Allied Specialties Co., 3101 W. Grand Ave., Chicago 2, Ill.

VISES

*American Chain & Cable Co., Bridgeport, Conn.
Columbian Vise & Mfg. Co., Cleveland, Ohio
Millers Falls Co., Greenfield, Mass.
Parker Co., Chas., Meriden, Conn.
Rock Island Div., Birtman Elec Co., Rock Island, Ill.
Stanley Tools, New Britain, Conn.

WASHERS, BUS

*American Chain & Cable Co., Bridgeport, Conn.
Bean Mfg. Co., John, Lansing, Mich.
Beaurline Fountain Brush Co., 1243 S. Wabash Ave., Chicago, Ill.
Brunner Mfg. Co., Utica 1, N. Y.
Choldun Mfg. Co., New Haven, Conn.
Clayton Mfg. Co., El Monte, Calif.
Curtis Pneumatic Mchy., Div. Curtis Mfg. Co., St. Louis 20, Mo.
Goulds Washing Systems, Inc., 20 N. Wacker Dr., Chicago, Ill.
Hardie Mfg. Co., Hudson, Mich.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Jetomatic Corp., Ansonia, Conn.
Leeds, Tozzer & Co., 92 Liberty St., New York, N. Y.
Myers & Bro. Co., F. E., Ashland, Ohio
*Ross & White Co., 400 W. Madison St., Chicago 6, Ill.
Washmobile Corp., 350 N. Foothill Rd., Beverly Hills, Los Angeles, Calif.
*Weaver Mfg. Co., Springfield, Ill.
Whiting Corp., Harvey, Ill.
Wolfe Brush Co., Pittsburgh, Pa.

WELDING and HARD FINISHING PROCESSES (Contract)

*Automotive Generator Service, St. Louis Mo.
Brodie System (B&J), Brooklyn, N. Y.
*Chain Lock Process Co., 7th & Cheltenham Ave., Phila., Pa.
Kerkling & Co., Bloomington, Ind.
Moguloid Co. of Amer., 1503 W. Van Buren St., Chicago 7, Ill.
Searles Electric Welding Wks., 1320 S. 47th St., Chicago, Ill.
Stark, Inc., Ralph, Long Island City, N. Y.

WELDERS, ELECTRIC and GAS

Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.
Allen Elec. & Eqpt. Co., Kalamazoo, Mich.
Eutectic Welding Alloys Corp., Flushing 58, N. Y.
General Electric Co., Schenectady 5, N. Y.
Hobart Brothers, Troy, Ohio
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill.
Lee Co., K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland 1, Ohio
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.
Marquette Mfg. Co., Minneapolis, Minn.
Milburn Co., Alex, Baltimore, Md.
Miller Elec. Mfg. Co., Appleton, Wis.
National Welding Eqpt. Co., San Francisco, Calif.
Peterson Welding Co., Kansas City, Mo.
Smith Welding Equipment Corp., Minneapolis, Minn.
Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Victor Eqipt. Co., San Francisco, Calif
Westinghouse Elec. Corp., Pittsburgh, Pa.

WHEELS, GRINDING

American Emery Wheel Works, Providence, R. I.
Carborundum Co., Niagara Falls, N. Y.
Norton Co., Worcester 6, Mass.
*Snap-On Tools Corp., Kenosha, Wis.
Van Norman Co., Springfield, Mass.

WRENCHES, END and SOCKET

Armstrong Bros. Tool Co., 317 N. Francisco Ave., Chicago 12, Ill.
Apco-Mossberg Co., Attleboro, Mass.
Billings & Spencer Co., Hartford 6, Conn.
*Blackhawk Mfg. Co., Milwaukee 1, Wis.
Bonney Forge & Tool Wks., Allentown, Pa.
Ebersole Mach. & Tool Corp., Pottstown, Pa.
Herbrand Corp., Fremont, Ohio
New Britain Machine Co., New Britain, Conn.
North Bros. Mfg. Co., Philadelphia, Pa.
Petersen Mfg. Co., De Witt, Neb.
Plomb Tool Co., Los Angeles 54, Calif.
*Snap-On Tools Corp., Kenosha, Wis.
Stevens Walden, Inc., Worcester, Mass.
Vichek Tool Co., Cleveland, Ohio
Williams & Co., J. H., Buffalo 7, N. Y.

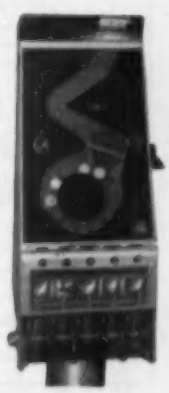
Cincinnati Transit Company Is Installing *Grant* Fare Registers On Entire Lines

THE TRANSIT INDUSTRY CONTINUES TO BUY MORE *Grant* FARE BOXES THAN ALL OTHER MAKES COMBINED—BY A BIG MARGIN!

If you want more information on how to increase your revenue —

Grant MONEY-METERS CO.
17 WARREN ST., PROVIDENCE, R. I., U. S. A.

WIRE, PHONE OR WRITE FOR FACTS ON:
Registering Machines
Lock Box Machines
Registering-Lock Box Machines
Ticket-Coin Machines
Registering-Ticket Machines



CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE:
$1.20 a line, minimum 3 lines. To figure advance payment, count 5 average words as a line.
POSITION WANTED undisplayed advertising rate is one-half of above rate, payable in advance.
DISCOUNT of 10% if full payment is made in advance of four consecutive insertions of undisplayed ads.

INFORMATION:
BOX NUMBERS count as one additional line in undisplayed ads.
EQUIPMENT WANTED OR FOR SALE acceptable only in Displayed Style.

EMPLOYMENT ADVERTISING:
New Employment Opportunities Section for Displayed ads starting July issue. For further details see announcement in this issue.

DISPLAYED RATE:
The advertising rate is $9.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅛ inch vertically on one column, 3 columns—30 inches—to a page. B.T.

SEND NEW ADVERTISEMENTS: Address New York Office, 330 W. 42nd Street, New York 36, N. Y., for July issue closing June 23rd.

HAPPY RIDERS COST LESS TO HAUL!

Yes—when you make them happy with BAUCO Replacement Seat Coverings! Because BAUCO wears better, lasts longer, COSTS LEAST in the long run or short haul. All types seats, zipper snap or tack-on. All grades transportation fabric. All color schemes. Phone or wire Geneva 8-8900 for quotations.

SouthernTRailways is another happy user of the new BAUCO Headrest Cap—the cap that LASTS! Made of Dupont Fabrilite, nylon-sewed throughout. All seams welted. Just wipe to clean. Non-porous. Resists cigarette burns. Non-abrasive to seat upholstery. Tailored to your coaches!

BAUCO **BERGEN AUTO UPHOLSTERY CO.**
26 GLEN RD., RUTHERFORD, N. J.

FROM LOSS TO PROFIT

Why tie up your wrecked coaches for months? Why try to rebuild yourself? In a short time we give you skilled repair of accident damage. All work by factory trained men. No job is too large or too small. Work must be satisfactory to customer.

We'll send wrecker for your coach if desired

NATIONAL COACH BODY REPAIR, Inc.
3121 West Huron, Pontiac, Mich.
J. W. KUKLINSKI
phone Pontiac, bus: FE 4-7943, res FE 2-7448

REPLIES Box (No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS WANTED

EQUIPMENT MAINTENANCE Engineer 30 years extensive background with extra large fleet operating experience. Gasoline, diesel. All phases. Services available immediately. Permanent or Consultant basis. PW-6075, Bus Transportation.

EQUIPMENT MAINTENANCE Superintendent 35 years experience. All phases—large transit operation—bus, street car and high speed service. Available at once, permanent or consultant basis. PW-6078, Bus Transportatiton.

AUTOMOTIVE MAINTENANCE Engineer, 27, is available. Experience, all phases maintenance, service, overhaul, testing GM, Mack diesel buses. Prefer New York location. PW-6553, Bus Transportation.

---

4 GMC PD4104 COACHES FOR SALE
$25,830 EACH
These are air-conditioned, have power steering and several other extras. No tires. Price quoted delivered in Tulsa, Okla. Subject to prior sale.
Missouri, Kansas & Oklahoma Coach Lines
Cincinnati at 4th, Tulsa 3, Okla.

FOR SALE
GOING OUT OF BUSINESS
1—1941 25-Passenger Flxible—Good Condition.
1—1947 25-Passenger Flxible—Sharp.
Both with tires ready to drive away. Make us an offer.
BEST MOTOR COACH, INC.
1624 Liberty St., Racine, Wis.

INVITATION TO BID

Confidential sealed bids will be accepted for the rental and servicing of tires and tubes required by Los Angeles Transit Lines for a period of three years beginning on or about August 1, 1955. Bids will be held in strictest confidence. Bids must be received on or before 5:00 P.M. July 15, 1955. These bids will be opened at 10:00 A.M. on July 16, 1955. Interested suppliers may get detailed information as to the requirements, terms and conditions of the proposed contract and the manner and method of making bids therefor by application to:

Mr. Cone T. Bass
Vice President—Operations
1060 South Broadway
Los Angeles 15, California

INVITATION TO BID

Confidential sealed bids will be accepted for the rental and servicing of tires and tubes required by Key System Transit Lines for a period of three years beginning on or about August 1, 1955. Bids will be held in strictest confidence. Bids must be received on or before 5:00 p.m., July 15, 1955. These bids will be opened at 10:00 a.m., on July 16, 1955. Interested suppliers may get detailed information as to the requirements, terms and conditions of the proposed contract and the manner and method of making bids therefor by application to:

Mr. G. L. Stanley, President, Key System Transit Lines
1106 Broadway, Oakland 7, California

BUS BUILDINGS
TERMINALS • GARAGES
Complete Professional Services
C. G. Mattberg
ARCHITECT
79 W. Palisades Blvd., Palisades Park, N. J.
Tel. LEonia 4-3707

Attention . . .

EMPLOYMENT ADVERTISERS

Effective with the July issue a new section will start in BUS TRANSPORTATION. We will head this section: EMPLOYMENT OPPORTUNITIES. All Displayed Employment Opportunity advertising will be placed in this new section, with the exception of those advertisers who contract for run-of-book position. New advertisers will be billed at the transient rate of $12.50 unless on contract. Contract rates furnished on request. Advertisements are subject to Agency Commission.

For full information write:
BUS TRANSPORTATION
Classified Advertising
330 West 42nd St., New York 36, N. Y.

UNUSUAL BUYS

Greyhound Diesel Silver Side Cruisers, 37 and 41 pass.
1951 G.M.C. TDH 3612 Transits.
1947 GMC TDH-3207 Diesel Transits.
PD 4101-2-3-4 Diesel Cruisers, 41 pass.
1950 GMC TDM 4509 Transits.
1947-8-9-50 Flxibles, 21 to 37 pass.
1952 GMC Diesel Suburbans, TDM-4509.
1945-7 GMC TDH 4507 Suburbans.
1949 GMC TDM 4010 Transits.
1945-6-7-8 Aerocoaches, $1750.00 up.
1952 GMC Diesel Transits, TDH-4509.
GMC PDA 3301-3702-3-4 Cruisers.

Financing Available
FS 6704 BUS TRANSPORTATION
330 West 42nd Street
New York 36, N. Y.

SCHOOL BUSES

We Have On Hand At All Times A Large Selection Of New & Used Buses For Immediate Delivery. All Guaranteed.
WOLFINGTON BODY CO. INC.
33rd & Arch Sts. Phila. 4, Pa.
BAring 2-5252

FOR SALE

3—1946 aerocoaches, 37 passenger
1—1944 PGA 3702 GMC Coach, 37 passenger
The above coaches are very clean and are in excellent mechanical condition. Reasonable prices.
Dismantling P46 aerocoaches and 743 GMC coaches with 671 diesel engines for parts.
For information and prices write:
THE BALTIMORE MOTOR COACH COMPANY
619 W. Biddle Street
Baltimore 1, Maryland
VErnon 7-5666

FOR SALE—
FLEXIBLE BUSES
1—1944, 29 Pass., Buick power, 2,000.00
2—1945, 25 Pass., Chev. power, 1,750.00 each
2—1948, 25 Pass., Chev. power, 2,650.00 each
All in excellent condition and now in service.
PHONE—WRITE—WIRE—for full information
COLUMBUS MARYSVILLE BUS CO.,
COLUMBUS, OHIO
PHONE Capitol 1-4242

WANTED—DISCARDED
GM71-HV Injector Parts
Top Money Paid.
Cassidy, 7120 Carnegie Avenue
Cleveland 3, Ohio

WANTED
National Cash Register Box
Joseph Schwarz
ORANGE & BLACK BUS LINES, INC.
419 Andersen Ave., Fairview, N. J.

WANTED TO BUY
2—G.M.C.—T.D.H. 3610 Coaches
Write or Call:
CENTRAL N. Y. COACH LINES, INC.
324 Oriskany Street, East, Utica, New York
Phone 5-5286

PRICES CUT

20—1950 Mack Diesels, Model C-50, Transit Type, 50 Passenger.

30—1954 GMC Model TGH-3102, Transit Type, 31 Passenger Hydramatic.

20—1952 Marmon-Herrington 8M2BA, 6 Cyl. Ford Engine, Transit.

25—1946 Mack C-41, Transit, 41 Passenger.

25—1947 Mack C-41, Transit, 41 Passenger.

15—1947 GMC TGH-3207, Transit, 32 Passenger.

25—1951 ACF-Brill C-31, Transit, Hall-Scott Engine, 31 Passenger.

25—1946 Twin Coach 345, Transit, 34 Passenger.

4—PD-3703, 1947 GMC Diesel parlor coach, Reclining seats, excellent condition, air conditioned.

15—1948 Beck Mainliners, 37 passenger parlor coach, reclining seats, Int'l Diamond 450 engine.

20—1946 Flxible, Model 90, parlor coach, 29 passenger, excellent condition.

1—4509 GMC Diesel Suburban, 45-Pass. 6 Cylinder Diesel, 1952 Model. Priced $12,500.00 each.

1—3702 4-71 Diesel, 37 Pass. Fully Silversided, Excellent Condition. Priced $4500.00.

2—3702 4-71 Diesel, 37 Pass. Not Silversided. Priced $2500.00 each.

ALL ABOVE COACHES IN EXCELLENT CONDITION, OPERATING DAILY UNDER STRICT SUPERVISION AND PREVENTIVE MAINTENANCE INSPECTION SYSTEM. CAN BE DELIVERED IMMEDIATELY. SUBJECT TO PRIOR SALE.

Call or Write, Inquiries Will Receive Immediate Attention:

GEORGE P. KEENA

NORTH PARK HOTEL BUILDING **1936 NORTH CLARK STREET, CHICAGO 14, ILLINOIS**
Phone: MOhawk 4-3200

TRANSIT BUSES FOR SALE

ALL EXCELLENT CONDITION
HAVE BEEN OPERATED DAILY
Under Preventive Maintenance Supervision
Ready for Immediate Release—Subject to Prior Sale

Macks—1946-'47	C-41
GMC's—1947	3207
Macks (Diesel)—1950	C-50
ACF-Brills—1951	C-31
Twin Coaches—1946	34-S

Quantity of Johnson Electric Fare Boxes—Type J

CALL OR WRITE

MIAMI TRANSIT COMPANY
P.O. Box 3581—Miami 30, Fla.—Phone 3-6311

CLEAN BUSES
PD-2903, 29-passenger, good condition.
1945-46 Aerocoaches, very clean.
A. A. Bregasse
CAROLINA COACH COMPANY
RALEIGH, NORTH CAROLINA

The largest selection of used
SCHOOL BUSES
IN WESTERN NEW YORK
Let us know your need.
HObart 3000; day or night
BUFFALO 24, NEW YORK
COTTRELL BUS SERVICE, INC.

Attention Bus Operators

DO YOU WANT TO SELL OUT

DO YOU WANT TO RENEW YOUR FLEET

We will buy your whole fleet for cash

WILL PAY MARKET VALUE FOR GOOD BUSSES

BUS SALES CORP.

400 FOUNTAIN STREET, PROVIDENCE, R.I. PHONE UN 1-5000

USED BUSES

RHODES BUS & EQUIPMENT CO. INC.

1475 BROADWAY NEW YORK 36, N. Y.

Phones BRyant 9-2584, 2585

RE-BUILT BUSES
OUR SPECIALTY
Will Buy Good Used Buses
BUS SALES CORP.
GAspee 1-4000
400 Fountain St. Providence 3, R. I.

FOR SALE
1—1945 Flxible, 29 Pass. Buick
1—1947 Flxible, 29 Pass. Buick
Good Mechanical Condition
LOUISIANA MOTOR COACHES
St. Louis, Missouri

SCHOOL BUSES
The Largest Selection of New & Used
Available When You Want Them
CALL
FRANK T. MEE, JR.,
Transit Sales & Ser., Inc.
23 South Street
Danbury, Connecticut
Tel. Pioneer 3-4437

FOR SALE
Two 27 pass. GMB Marmon Herrington Coaches with less than 60,000 miles. Like new inside and out. $4500.00 each.
ACE TRANSPORTATION CO.
J. E. Osborne
310 S. 2nd Ave. W., Albert Lea, Minn.

FOR SALE
1—1945—29 PASSENGER FLXIBLE.
1—1947—29 PASSENGER FLXIBLE.
ZANE TRANSIT LINES
1507 Augusta St. Zanesville, Ohio

FOR SALE
Very Reasonable
Model K Johnson Fare Boxes
Joseph Schwarz
ORANGE & BLACK BUS LINES, INC.
419 Anderson Ave., Fairview, N. J.

FOR SALE G.M. DIESELS
1 P.D. 3302—1 P.D.A. 3703—1 P.D.G. 3701 with 41 reclining seats (air condi.)—1 P.G. 2903.
Will sell or trade for P.D. 4101, 2, 3
WILSON BUS LINES INC.
Ashburnham, Mass. Phone Talbot 7, 5815

BUS SEATS FOR SALE
For General American Aerocoach, Fitzjohn 610 Falcon and ACF 1C 37/41
In good condition
Also one 37 passenger set of Heywood Wakefield De Luxe Recliner Seats—near new.
AMERICAN BUSLINES, INC.
1805 Leavenworth St., Omaha, Nebraska
Mr. A. B. Schliep

FIFTY BOOSTER HEATER ASSEMBLIES
Reconditioned Surface Combustion-Janitrol and Fluid-Heat models for GMC Diesel...$50.00 each
EAU CLAIRE TRANSPORTATION COMPANY
1001 Menomonie Street, Eau Claire, Wis.

Don't Say, *"They're not worth anything"*

THOSE surplus Used Buses you have on your hands can be turned into cash! The fact that they are of no further value to you doesn't mean they're not of value to somebody else. There's always a market for good used buses. If you have surplus used buses for sale you may (especially right now) be helping other operators —other readers of BUS TRANSPORTATION—by bringing such equipment to their attention *at once*. You can do so through dealers in used buses. They are recognized sources of distribution and may be able to place the buses you have for sale immediately. Or, if you want to contact user-buyers direct, you can do so effectively, and at small cost through advertising in the:

SEARCHLIGHT SECTION
of
BUS TRANSPORTATION

FOR SALE OR TRADE

6—1945-1946 Ford 298 Transit—28 Pass. (6 Cyl.—2 Speed Rear)
5—1948 Ford 8MB Transit—27 Pass. (6 Cyl.—Side Door)
2—1941 GMC PG29 Suburban—31 Pass. (6 Cyl. GMC Model 426)
2—1942 ACF-Brill PBS—37 Pass.
1—1945 White 788 Converted Highway Post Office (Excellent Running Condition)
White Engine Model 24A
White Transmission Model 56-Bal-4
White Differential Assy.
ACF Engines Model 180
ACF Cylinder Heads for Model 180 or 190 Engines
ACF Transmission Model 8141
ACF Differential Assy.
Ford Transit Parts (SPECIAL DISCOUNT)
Registers—Ohmer Models 80, 81 and 90
Rub-Bub No. 4 in 5 Gal. Lots. Bargain Price.

TRANS-DEL EQUIPMENT CO.
BROAD ST., PHILLIPSBURG, NEW JERSEY
PHONE PHILLIPSBURG 5-2662

G.M.C. DIESELS

37 PASSENGER DE LUXE RECLINER — 4-71 ENGINE
ALUMINUM PANEL BODY — LATE MODEL PDA-37

$2950.00 EACH — IMMEDIATE DELIVERY

Only a couple A.C.F. 1C-41 Air Conditioned Coaches remain of large lot advertised. Will clear them out at same $2950 each.

WILLIAM JAY — COACH REBUILDERS
229 SHELL ROAD, CARNEY'S POINT, N. J.

MAKE US AN OFFER

3 FORD CUB 1951
19 Passenger Transit

Willett Bus Service, Inc.
700 S. Desplaines St., Chicago 7, Ill.

Sensational
55 CHEVROLET

12 passenger
STAGEWAY COACH
"Finest small coach ever built"
For Information—
Call, Write, Wire:
QUEEN CITY CHEVROLET COMPANY
6th & Sycamore, Cincinnati, Ohio
PA 4880

FARE BOXES FOR SALE

ALL TYPES
ELECTRIC AND MANUAL
Excellent Condition
IMMEDIATE DELIVERY

FRANK M. JUDGE & COMPANY, Inc.
7010 Empire State Building
New York 1, N. Y.
LO. 5-7372-3

WANT TO SAVE MONEY?

Purchase Your Next Buses From Us
Let Us Know Your Needs

McLaughlin Bus & Equipment Co.
1224 No. Main St., Providence 4, R.I.
MAnning 1-5852 PAwtucket 2-6493

1951-50-49-48 Flxible, 29-33 pass.
1952 GM PD 4103, 41 pass., air cond.
1954 GM PD 4104, 41 pass., air cond.
1950-51 GM PD 4102, 41 pass., air cond.
1949 GM PD 4101, 41 pass., air cond.
1948-47-46 GM PD & PG, 29-33 pass.
1949-48-47 ACF, 41-37 pass., air cond.
1948-47-46 Beck, 37-33 pass.
1948-47 Aerocoach, 37 pass., air cond.
1948-47-46-45 Aerocoach, 37 pass.
1947 Beaver, 37 pass., single door.
1946 Twin Coach, 39 pass., single door.
1947-46 Fitzjohn Duraliner, 28 pass.
1945 Fitzjohn Falcon, 35 pass.

Let us know what you need and what you have to sell.
BRICKERT OIL CO.
Phone 283, Farmville, Va.

HERCULES JXD ENGINES
U. S. SURPLUS — $245.00

Unconditionally Guaranteed
Complete Less Accessories

Bus Starters and Generators Available

FORBES MOTOR CO.
VA 4-0100
RT. #22 (PGH)
MONROEVILLE, PA.

AEROCOACHES 1945, 46, 47

37 Passenger Recliner
Flexible bus 1947
29 Pass. Recliner
One Gas Engine for 1939 Yellow Coach
S. & S. BUS SERVICE
Washington Avenue Extension
R. D. 1, Rensselaer, N. Y.

TWO REBUILT FLXIBLE

29 passenger buses for sale at bargain.

HOLLIS TOURS
Greenville, South Carolina

FOR SALE

Make us an offer.
Must dispose of these buses.

One 29 pass. Reo, standard shift—Continental pancake engine. Never run.
Two 33 pass. Reos. Spicer Torque converters—427 cu. inch Continental pancake engine. New.
One 37 pass. Reo. Spicer Torque converter—427 cu. inch pancake engine. New.
These buses have had less than 2 yrs. service.

Over $3500.00 in new parts thrown in with sale.

J. E. Osborne
ACE TRANSPORTATION CO.
310 S. 2nd Ave. W., Albert Lea, Minn.

FOR SALE

1 GMC DeLuxe Cruiser
Completely Rebuilt
Ready for Immediate use
Ford Buses—1945-6-7-8
Very good condition
Ford Parts
529 GMC Engine Parts

SUBURBAN TRANSIT CORP.
750 SOMERSET ST.
NEW BRUNSWICK, N. J.

FOR SALE

4 Southern Coaches 31 passenger 1947
5 Fords 27 passenger 1947
All in good running condition
Priced right for quick sale

Owensboro Rapid Transit, Inc.
Owensboro, Ky.

BUSES FOR SALE

All makes and types of Buses a variety on hand, reconditioned, good tires, guaranteed. Available for immediate delivery

CHICAGO USED BUS MART
5345 Cottage Grove Ave., Chicago 15, Ill.
Midway 3-9118

FOR SALE

SEVERAL 1946—37 PASSENGER AEROCOACH BUSES
Powered with Red 450 gasoline engines. Buses in excellent condition. Priced right, can be furnished with or without tires. For further information contact,

TAMIAMI TRAIL TOURS, INC.
P.O. Box 2938, 1010 E. Lafayette St.
Tampa, Florida

FOR SALE

1—ACF coach; 1937 H-9
Good for parts; includes 180 Hall-Scott engine, 2 Spicer transmission, new clutch, etc. Make reasonable offer.

ROBERT MOHR
731 Ridge Ave., Pittsburgh 12, Pa.
Tel.: CEdar 1-5276

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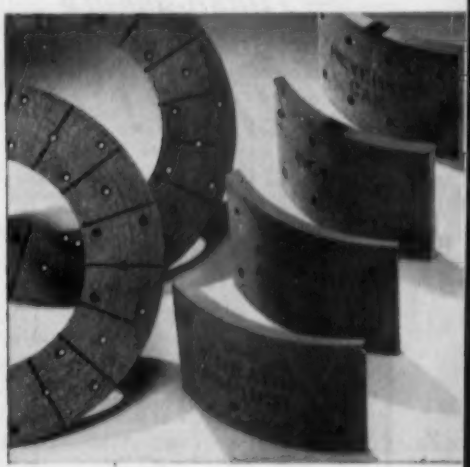
"Do you think I like being late? It's those cheap brake blocks!"

Trying to handle a heavily loaded bus with poor brakes is a headache for *any* driver. It raises Cain with schedules, too. Any way you look at it, cheap brake blocks are a losing proposition.

Get Grey-Rock *Balanced* Brake Blocks for your bus fleet. They'll help cut your cost per mile. For next to tire replacement, brake service, including drum replacement, is your costliest maintenance item. Grey-Rock combines just the right friction materials to equalize wear in blocks —to help maintain balance between shoes in the same wheel and between front and rear axles. With balanced brakes you get extra miles between relines, far less costly drum replacement, big decreases in pull-in and downtime for repairs. For lower cost per mile, have your Grey-Rock jobber show you facts and figures.



Best to STOP with... Because they're best to START with

Only Grey-Rock *makes*

BALANCED BRAKSET LININGS

BALANCED BRAKSETS • TRUCKSETS • BRAKE BLOCKS • VEE-LOK® CLUTCH FACINGS

GREY-ROCK DIVISION of Raybestos-Manhattan, Inc., Manheim, Pa.

RAYBESTOS-MANHATTAN, INC., Brake Linings • Brake Blocks • Clutch Facings • Radiator Hose Fan Belts • Industrial Rubber, Engineered Plastic, and Sintered Metal Products • Rubber Covered Equipment • Asbestos Textiles • Packings • Abrasive and Diamond Wheels • Bowling Balls

Another "TRAILWAYS" hits the ROAD-RUNNER Trail!

The ROAD-RUNNER

FLASH!

Another TRAILWAYS coach line has repeated! Two more ROAD-RUNNERS have just been ordered by Southern Trailways of Macon, Georgia—which previously purchased a ROAD-RUNNER right on-the-spot at the NAMBO Convention in September. This is their SECOND repeat order since then! Yes, indeed, *"a repeat order is the best sign of satisfaction!"*

Equipped with the FITZJOHN "MAGIC CARPET" AIR-SUSPENSION SPRINGS

PASSENGERS FLOAT ON AIR

FITZJOHN Air-Suspension offers passengers a comfort-plus ride. The "MAGIC CARPET" provides buoyancy without a sway and takes the bumps without jolting or jarring as the passengers "float through the air with the greatest of ease", rest and enjoyment. To bus operators this means less wear and tear — less vibration — less shock AND REDUCED MAINTENANCE COSTS!!

IT'S the "Queen" of the Buses for Queen City! More ROAD-RUNNERS are on order and will soon be on their way—to Queen City Trailways of Charlotte, N. C.—one of the largest Trailways companies in the country.

SOUTH, East, West, North—bus operators have found Fitzjohn is the bus designed with operators' *profits* in mind! These fine new ROAD-RUNNER intercity coaches will carry Trailways customers in comfort—while cutting expenses for Queen City's operations—proving themselves in actual performance as they have for other smart operators all over the U.S.A.

Yes, be wise—economize! You, too, can cut down operating and maintenance costs without cutting out those "living-room comfort" extras that mean *"passenger-appeal!"* The ROAD-RUNNER saves YOU money—yet offers all this:

LOOK AT THESE ADDITIONAL OUTSTANDING FEATURES:

Beautiful, modern interior and exterior • Plenty of luggage room—overhead ceiling racks plus spacious, lighted side compartments • Roomy, comfortable foam rubber recliner seats with ample foot rests • Big, green-tinted Solex glass picture windows—give a fine "passenger's eye view" while reducing sun glare • Power ventilation (air conditioning optional) • Choice of powerful Cummins diesel or Waukesha gasoline engine.

Send now for complete information and specifications on this outstanding new Fitzjohn coach! Or ask for a demonstration—see and FEEL for yourself!

Builders of Fine Motor Coaches for More Than Thirty Years!

FITZJOHN COACH COMPANY
MUSKEGON, MICHIGAN

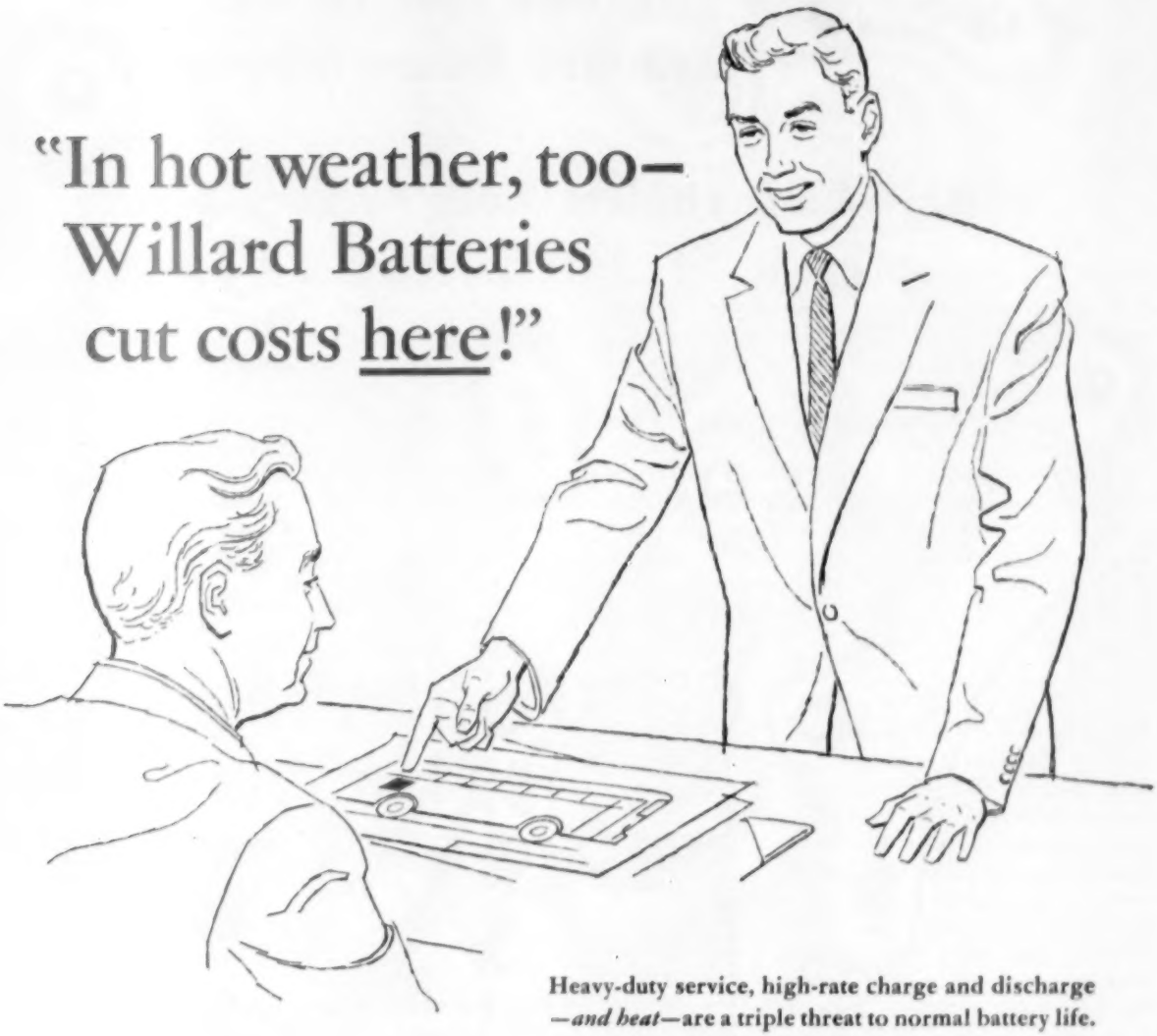
IN MEXICO
Distribuidora de Omnibus Fitzjohn, S. A.
Ave. Morelos No. 83
Mexico City, Mexico

N. E., N. J. and East N. Y. Distributors
Transit Sales and Service, Inc.
Danbury, Connecticut

CANADIAN COMPANY—FITZJOHN COACH OF CANADA, LTD., Brantford, Ont.

"If it's made by Fitzjohn, it's made to make you money!"

"In hot weather, too— Willard Batteries cut costs here!"



Heavy-duty service, high-rate charge and discharge —*and heat*—are a triple threat to normal battery life.

It makes good sense to install heat-resistant Willard Bus Batteries. They last longer because they're built to resist overcharge cycling . . . to take summer heat in stride.

A strong hard-rubber container, thick positive plates, Wilmec insulation and exclusive Metalex grid material combine to offset power-robbing, battery-killing heat. See for yourself. A local Willard Distributor will be glad to set up a test installation in one of your own buses.

Willard 6-48-160, a 12-volt, 160 ampere-hour bus battery recommended for both gasoline and diesel-powered buses in continuous hot weather operation.

Willard

STORAGE BATTERY COMPANY
Cleveland 1, Ohio

Factories in: Allentown • Atlanta • Aurora • Cleveland • Dallas • Denver • Fairfield • Kansas City • Los Angeles • Memphis Minneapolis • Omaha • Portland • Warsaw • Toronto • Calgary

New Idea For

Extending Lube Periods Reducing Grease Inventories

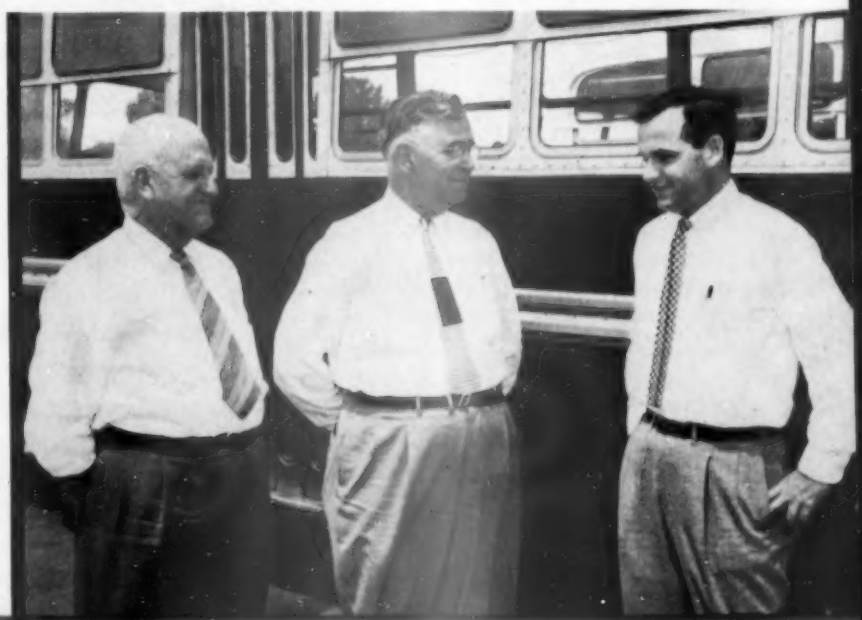
STANDARD Lithium Multi-Purpose Grease

Waterloo-Cedar Falls Transit Company operates 48 units serving this Iowa metropolitan area. In September, 1953, seeking to increase time between lubrication jobs, they began using STANDARD Lithium Multi-Purpose Grease for all bus lubrication. Results since that date: not one lubricating failure or problem. In addition the company not only cut costs but reduced grease inventories. Now STANDARD Lithium Multi-Purpose Grease lubricates every spot on equipment needing lubrication, including wheel bearings, water pump, throw out bearings, generators, etc.

STANDARD Lithium Multi-Purpose Grease is water and heat resistant. It can be used to lubricate all types of bearings—ball, roller, plain and needle. It can be used in mechanical and hand operated dispensers. Using it eliminates stocking most special purpose greases, thus greatly reducing the possibility of costly mistakes in selecting greases, one of the biggest maintenance hazards.

Like to know more about STANDARD Lithium Multi-Purpose Grease? In the midwest, call your nearby Standard Oil Automotive engineer. He will be happy to help you. Or contact, Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Waterloo-Cedar Falls Transit Co., Leon M. Gahwiller, Manager, and J. S. Duncan, Vice President and General Manager, talk over lubrication problems with Standard Automotive Engineer, Stanley L. Johnson. Discussions like this lead to savings on lubrication. Stan Johnson has been helping bus, truck and contractor fleet operators lick lubrication problems since he completed the Standard Oil Automotive Sales Engineering School. Stan is a graduate of Iowa State College, Ames, with B.S. in engineering. Customers have found this experience and training pay off for them.



Waterloo-Cedar Falls Transit Co. operates 48 bus units in this Iowa metropolitan area, uses STANDARD Lithium Multi-Purpose Grease for all lubrication on buses.

STANDARD

STANDARD OIL COMPANY

(Indiana)